agere systems

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Soft Modem AT Command Reference Manual

Introduction

The following reference manual specifies the Agere Systems Inc. AT command set for soft modem products.

Agere Systems soft modems support a broad base of commands for data and FAX. The command set includes support for the basic data commands standardized by ITU-T recommendation V.250* (05/99), and class 1 FAX commands standardized by ITU-T recommendation T.31 (08/95).

This document contains an overview of the supported commands, responses, and registers used by Agere Systems soft modem based products. However, a particular modem may not support the entire AT command set. Some features are dependent on product application, licensing, and other contractual agreements.

* This document contains additional commands which support V.92.

Table of Contents

Contents **Page**

Introduction ... 1
How to Use This Manual ... 5
AT Command Conventions ... 5
Sample Command ... 5
Basic Syntax Commands ... 6
Extended Syntax Commands ... 6
S Register Conventions ... 6
S register sample ... 7
Other Document Conventions ... 7
AT Command Set ... 8
Data and General Commands ... 8
+++Escape Sequence ... 8
A/—Repeat Last Command ... 8
A—Answer ... 8
B<value>—Communication Standard Setting ... 9
C<value>—Carrier Control ... 9
D<dial string>—Dial ... 9
E<value>—Echo Command ... 10
F<value>—On-Line Data Character Echo Command ... 11
H<value>—Hook Control ... 11
I<value>—Request ID Information ... 11
L<value>—Speaker Volume ... 14
M<value>—Speaker Control ... 14
N<value>—Modulation Handshake ... 14
O<value>—Return to On-Line Data Mode ... 15
P—Select Pulse Dialing ... 15
Q<value>—Result Code Control ... 15
S<register_number>=<value>—S Register Control ... 16
T—Select Tone Dialing ... 16
V<value>—DCE Response Format ... 16
W<value>—Result Code Option ... 17
X<value>—Extended Result Codes Control ... 17
Y<value>—Long-Space Disconnect ... 18
Z<value>—Reset and Recall Stored Profile ... 19
&B<value>—V.32 Auto Retrain ... 19
&C<value>—Data Carrier Detect (DCD) Control ... 19
&D<value>—Data Terminal Ready (DTR) Control ... 20
&F<value>—Restore Factory Default Configuration ... 20
&G<guard tone>—V.22 bis Guard Tone Control ... 20
&J<value>—Auxiliary Relay Option ... 21
&K<value>—Local Flow Control Selection ... 21
&M<value>—Asynchronous Communications Mode ... 21
&P<value>—Pulse Dial Make-to-Break Ratio Selection ... 22
&Q<value>—Asynchronous Communications Mode ... 22
&S<value>—Data Set Ready (DSR) Option ... 23
&T<value>—Self-Test Commands ... 23
&V<value>— Display Current Configuration ... 24
&W<value>—Store Current Configuration ... 25
&Y<value>—Select Stored Profile for Hard Reset ... 25
&Z<storage location>=<dialing sting>—Store Telephone Number ... 25
\A<value>—Select Maximum MNP Block Size ... 25
\B<break time>—Send Break ... 26

Table of Contents

Contents **Page**

\G<value>—Modem Port Flow Control 26
\J<value>—Adjust Bits/s Rate Control 26
\K<value>—Set Break Control 27
\N<error_control>—Select Error Control Mode 28
\Q<value>—Local Flow Control Selection 28
\R<value>—Ring Indicator Signal Off After Answer 29
\T<time delay>—Inactivity Timer 29
\V<value>—Protocol Result Code 29
%B—View Numbers in Blacklist 30
%C<value>—Data Compression Control 30
%E<value>—Auto Fallback/Fallforward Control 30
-C<value>—Data Calling Tone 30
-V90=<rate>—Enable/Disable V.90 Settings 31
+A8E=<v8o>,<v8a>,<v8cf>,<v8b>—V.8 and V.8 bis Operation Controls 32
+A8T=<signal>,<1st_message>,<2nd_message>,<sig_en>,<msg_en>,<supp_delay>—Send V.8 bis Signal and/or Message 33
+DR<value>—Data Compression Reporting 34
+DS=<direction>,<compression_negotiation>,<max_dict>,<max_string>—V.42 bis Data Compression 35
+DS44=<direction>,<compression_negotiation>, <capability>, <max_codewords_tx>, <max_codewords_rx>,<max_string_tx>,<max_string_rx>,<max_history_tx>,<max_history_rx>— V.44 Data Compression 35
+EB=<break_selection>,<timed>,<default_length>—Break Handling In Error Control Operation 37
+EFRAM=<value 1>,<value 2>—Frame Length 38
+ER=<value>—Error Control Reporting 39
+ES=<orig_rqst>,<orig_fbk>,<ans_fbk>—Error Control Selection 39
+ESR=<value>—Selective Repeat 40
+ETBM=<pending_TD>,<pending_RD>,<timer>—Call Termination Buffer Management 41
+EWIND=<value_1>,<value_2>—Window Size 42
+FCLASS=<value>—Service Class Indication 42
+GCAP—Request Complete Capabilities List 43
+GCI=<T.35_country_code>—Country of Installation 43
+GMI—Manufacturer Identification 44
+GMM—Modem Identification 44
+GMR—Request Revision Information 44
+GOI—Request Global Object Identification 45
+GSN—Request Product Serial Number Identification 45
+IDSR=<value>—Select Data Set Ready Option 45
+IFC=<DCE_by_DTE>, <DTE_by_DCE>—DTE-DCE Local Flow Control 46
+ILRR=<value>—DTE-DCE Local Rate Reporting 46
+IPR=<DTE rate>—Fixed DTE Rate 47
+MA=<carrier 1>,<carrier 2>, ...—Modulation Automode Control 48
+MR=<value>— Modulation Reporting Control 48
+MS=<carrier>,<automode>,<min_rate>,<max_rate>—Modulation Selection 49
+MSC=<src_v34>—Seamless Rate Change Enable 51
+PCW=<call_waiting>—Call Waiting Enable 51
+PIG=<value>—PCM Upstream Ignore 52
+PMH=<value>—Modem On Hold Enable 52
+PMHF—Modem On Hold Hook Flash 53
+PMHR—Initiate Modem On Hold 53
+PMHT=<value>—Modem On Hold Timer 53
+PQC=<value>—V.92 Phase 1 and Phase 2 Control 54
+PSS=<value>—Use Short Sequence 55

Table of Contents

Contents **Page**

+VCID=<value>—Caller ID 55
FAX Commands 56
+FAA=<value>—Adaptive Answer 56
+FCLASS=1—Enter Class 1 FAX Mode 56
+FMI?—Manufacturer Identification 57
+FMM?—Product Identification 57
+FMR?—Version/Revision Information 57
+FPR=<value>—Select FAX Port Rate 58
+FRH=<mod>—Receive HDLC Data with <mod> Carrier 58
+FRM=<mod>—Receive Data 59
+FRS=<value>—Receive Silence 60
+FTH=<mod>—Transmit HDLC Data with <mod> Carrier 61
+FTM=<mod>—Transmit FAX Data with <mod> Carrier 62
+FTS=<value>—Transmission Silence 62
Test and Debug AT Command 63
#UD—Unimodem Diagnostics 63
Result Codes 70
S-Registers 72
S-Register Definitions 73
S0—Auto-Answer Ring Number 73
S1—Ring Counter 73
S2—AT Escape Character (User-Defined) 74
S3—Carriage Return Character (User-Defined) 74
S4—Line Feed Character (User-Defined) 74
S5—Back Space Character (User-Defined) 74
S6—Time For Dial Tone 75
S7—Wait Time For Carrier 75
S8—Pause Time For Dial Delay Modifier 75
S11—DTMF Tone Duration 75
S12—Escape Guard Time 76
S14—General Bit-Mapped Options Status 76
S20—Sync Mode Underrun Fill Character 76
S21—V.24/General Bit-Mapped Options Status 76
S22—Results Bit-Mapped Options Status 77
S23—General Bit Mapped Options Status 78
S27—General Bit Mapped Options Status 78
S28—General Bit-Mapped Options Status 79
S29—Flash Dial Modifier Duration 79
S30—Inactivity Timer 80
S36—LAPM Failure Control 80
S37—Dial Line Rate 81
S48—LAPM Error Control and Feature Negotiation 81
S53—General Bit Mapped Options 82
S54—Blind Dialing Delay 82
S56—General Bit Mapped Options 83
S91—Data Transmit Level 83
S92—FAX Transmit Level 83
S93—DTMF Transmit Level 84
S94—DTMF Transmit Level for High DTMF Group 84
AT Command Cross Reference Tables 85

How to Use This Manual

The Agere Systems soft modem AT command set consists of commands based on data and FAX communication. The commands presented in this manual follow the conventions set by ITU-T recommendation V.250 (05/99) which standardized many of the common AT extensions.

This section identifies the relevant standards from V.250 and any modifications to presentation which have been made for clarity and ease of use.

The Agere Systems soft modem AT command set also includes commands which have not been standardized by a specific ITU recommendation. Some of these commands support legacy systems, other commands support test and debug efforts, and others support features which are specific to Agere Systems' products.

AT Command Conventions

This document describes the AT commands and S registers supported in the Agere Systems soft modem products. Presentation format for each command has a standard layout consisting of the following:

- A command title.
- A general command description.
- Result codes including the conditions for obtaining the result.
- A detailed command description.

The command title is formatted in large bold letters and contains the command, its parameters, and a descriptive command name. The general command description identifies in broad terms the function of the command and when to use it. The detailed command description breaks down the effect of each of the parameters' values. This section may also contain supplementary information needed for proper usage of the command.

The modem or data circuit terminating equipment (DCE) returns at least one result code for each command submitted to it by the host system or data terminal equipment (DTE). Conditions for receiving the result code follow the listed result code.

Sample Command

E<value>—Command Echo

Use this command to instruct the modem to echo characters sent to it. When the echo feature is selected, characters sent to the modem are sent back to the host and displayed on the monitor.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 1. E<value> Commands

Command	Function
E0	Disables echo command.
E1	Enables echo command (default).

How to Use This Manual (continued)

AT Command Conventions (continued)

Basic Syntax Commands

Basic syntax commands use the following format:

- <command>[<parameter>]

Where <command> is a single character or a group of characters that represent the command and <parameter> is an optional decimal number. There are some exceptions to these rules and they are noted for each command as needed. The echo command in the previous example follows the basic commands syntax structure.

Extended Syntax Commands

Extended syntax commands* have three different command formats:

- No parameters: +<name>
- Single parameter: +<name>[=<parameter>]
- Multiple parameters: +<name>[=<parameter1>][,<parameterX>]

Where <name> is the name of the command and begins with an alphanumeric character and <parameterX> is an optional decimal number. There are some exceptions to these rules and they are noted for each command as needed.

In addition to the standard command format, extended commands have a read and test syntax. The host system uses the read syntax to pole the modem and determine the current setting for the command parameters. Read syntax has the following format:

- Read syntax: +<name>?

The host system uses the test syntax to pole the modem and determine the supported parameter values for the command. Test syntax has the following format:

- Test syntax: +<name>=?

The modem responds to this command with a list of the supported parameter ranges.

S Register Conventions

S registers contain parameters used by the modem. The presentation format for an S register is similar to the format used for an AT command. Each S register has a standard layout consisting of the following:

- S register title.
- S register description.
- Parameter description.

The S register title is formatted in large bold letters and begins with a capital S followed by the register number. The title also includes a descriptive name for the register. The S register description defines the parameter the S register represents.

S register parameters can have a variety of effects on the functionality of the modem. As a result the parameter description can have several forms. The most common form includes the parameter range, the parameter default, and the units used by the parameter.

* The description of extended syntax commands presented here is a simplified version of the information presented in ITU-T recommendation V.250 (05/99). For further details, refer to section 5.4 of recommendation V.250.

How to Use This Manual (continued)

S Register Conventions (continued)

S register sample

S2—Escape Character (User-Defined)

S2 contains the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII +. The escape sequence allows the modem to exit data mode and enter command mode when on-line. A value over 127 disables the escape process, i.e., no escape character will be recognized.

- Range: 0—255.
- Default: 43 (+).
- Units: ASCII.

Other Document Conventions

For the sake of clarity, the following conventions have been adopted and used throughout this document.

Table 2. Other Document Conventions

Item	Example	Conventions Description
AT Command	**&C<value>**	AT commands are all capitals followed by their parameter values in bold print. This document does not explicitly use the AT prefix when presenting commands. However, the AT prefix is used for all examples.
S Registers	S<value>	S registers have a capital S followed by the register number.
Parameters	<value>	Parameters or variables always use lower case lettering enclosed in brackets, <>.
Results Codes	*OK*	Result codes are all capitals and italics.
Examples	—	Examples use the courier font and are shown exactly as they appear when the commands are entered into a terminal program such as *Windows** Hyperterminal.

* *Windows* is a register trademark of Microsoft Corporation.

AT Command Set

AT commands are issued to the modem to control the modem's operation and software configuration. The basic command syntax is as follows:

- <command><parameter>.

The <command> is a combination of the attention prefix (AT) followed by the AT command. The <parameter> is a string which represents a numeric decimal value.

Note: If a parameter value is not entered then the soft modem assumes a parameter value of zero.

Any command issued is acknowledged with a response in either text or numeric values. These responses are known as result codes. The result codes are listed in Table 152.

AT commands can only be entered while the modem is in command mode. Command mode is entered under one of the following conditions:

- After powerup, at the termination of a connection, or after the execution of a command other than dial or answer.
- Upon the receipt of the escape sequence (three consecutive characters matching the contents of register S2) while in on-line mode.
- Upon the on-to-off transition of DTR if **&D1**, **&D2**, or **&D3** has been set.

Data and General Commands

+++Escape Sequence

An escape sequence allows the modem to exit data mode and enter on-line command mode. While in on-line command mode, AT commands are sent directly to the modem. Use the return to on-line data mode command (see O<value>—Return to On-Line Data Mode on page 15) to return to data mode.

Place a pause before and after the escape sequence to prevent the modem from interpreting the escape sequence as data. The length of the pause is set by register S12 (see S12—Escape Guard Time on page 76), the escape guard time. Register S2 (see S2—AT Escape Character (User-Defined) on page 74) identifies the escape sequence character.

A/—Repeat Last Command

Use this command to repeat the last AT command. The modem repeats the command currently in the command buffer. Do not use the AT prefix with this command. Do not conclude the command with a terminating character such as enter.

A—Answer

This command instructs the soft modem to go off-hook and answer an incoming call.

AT Command Set (continued)

Data and General Commands (continued)

B<value>—Communication Standard Setting

Use this command to select the communication standard used by the soft modem.

Result codes:

- *OK* if <value> = 0—3, 15, 16.
- *ERROR* if <value> ≠ 0—3, 15, 16.

Table 3. B<value> Commands

Command	Function
B0	Selects CCITT V.22 mode when the modem is at 1200 bits/s.
B1	Selects Bell 212A when the modem is at 1200 bits/s (default).
B2	Deselects V.23 reverse channel (same as **B3**).
B3	Deselects V.23 reverse channel (same as **B2**).
B15	Selects V.21 when the modem is at 300 bits/s.
B16	Selects Bell 103J when the modem is at 300 bits/s (default).

C<value>—Carrier Control

This command is supported to ensure compatibility with communications software that issues the **C1** command. However, this modem does not support the **C0** command. The **C0** command instructs some modems not to send carrier (i.e., it puts them in receive-only mode).

Result codes:

- *OK* if <value> = 1.
- *ERROR* if <value> ≠ 1.

Table 4. C<value> Commands

Command	Function
C1	Normal transmit carrier switching (default).

D<dial string>—Dial

This command instructs the soft modem to go off-hook and begin the dialing sequence. The dial string (<dial string>, including modifiers and the telephone number) is entered after the **D** command.

A dial string can be up to sixty characters long. Any digit or symbol may be dialed as touchtone digits. Characters such as spaces, hyphens, and parentheses are ignored by the modem and may be included in the dial string to enhance readability.

AT Command Set (continued)

Data and General Commands (continued)

D<dial string>—Dial (continued)

Table 5. Dial Modifiers

Modifier	Function Name	Description
L	Dial the last number	Instructs the modem to dial the last number dialed. This modifier is valid only if it is the first symbol of the dial string. All consecutive characters are discarded.
P	Select pulse dialing	—
T	Select tone dialing (default)	—
W	Wait for dial tone	Instructs the modem to wait for a second dial tone before processing the dial string.
,	Dial pause	Instructs the modem to pause before processing the next character in the dial string. Register S8 (see S8—Pause Time For Dial Delay Modifier on page 75) determines the length of the pause.
!	Hook flash	Instructs the modem to go on-hook for 0.5 s and then return to off-hook.
@	Wait for quiet answer	Instructs the modem to wait for 5 s of silence after dialing the number. If silence is not detected, the modem sends a *NO ANSWER* result code back to the user.
;	Return to command mode	Instructs the modem to return to command mode after it has finished dialing without disconnecting the call. This modifier must be the last character in the dial string.
$	Bong tone detection	—
S=<location>	Dial from register	Instructs the modem to dial a telephone number previously stored using the **&Z<location>=<dial string>** command. Valid storage locations are 0—3.

E<value>—Echo Command

Use this command to enable or disable the soft modem echo feature. When the echo feature is selected and the modem is in command mode, characters sent to the modem are sent back to the host and displayed on the monitor.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 6. E<value> Commands

Command	Function
E0	Disables echo command.
E1	Enables echo command (default).

AT Command Set (continued)

Data and General Commands (continued)

F<value>—On-Line Data Character Echo Command

This command is supported to ensure compatibility with communications software that issues the **F1** command. The **F0** version of this command is not supported. This command was originally used to set echo features for the DTE.

Result codes:

- *OK* if <value> = 1.
- *ERROR* if <value> ≠ 1.

Table 7. F<value> Commands

Command	Function
F0	On-line data character echo enabled (not support).
F1	On-line data character echo disabled.

H<value>—Hook Control

This command instructs the modem to go either on-hook to disconnect a call or off-hook to make the telephone line busy.

Result codes:

- *OK* if <value> = 0—1*.
- *ERROR* if <value> ≠ 0—1.

Table 8. H<value> Commands

Command	Function
H0	soft modem goes on-hook (default).
H1	soft modem goes off-hook.

I<value>—Request ID Information

This command displays specific product information about the modem.

Result codes:

- As described in Table 9 if <value> = 0—11.
- *ERROR* if <value> ≠ 0—11.

* ITU-T Recommendation V.250 (05/99) standardized this command. However, the standard does not include the additional functionality added with the H1 command.

AT Command Set (continued)

Data and General Commands (continued)

I<value>—Request ID Information (continued)

Table 9. I<value> Commands

Command	Function
I0, I3	Returns modem identity string and driver version number.
I1	Returns *OK*.
I2	Returns *OK*.
I4	Returns the driver build date.
I5	Returns the driver version, bus type (PCI, AC97), codec type, and country.
I6	Returns *OK*.
I7	Hardware version.
I8	Codec type.
I9	Returns country ID in English.
I10, I11	Displays connection information as described below. If the modem has not connected with a remote DCE the **ATI11** commands returns - *No Previous Call*.

The **ATI11** results are listed on two screens. To get to the second screen, the user must hit any key. The following is an example of the **ATI11** results.

```
Description                                                  Status
---------------                                              ------------
Last Connection                                              V.90
Initial Transmit Carrier Rate                                26400
Initial Receive  Carrier Rate                                52000
Final   Transmit Carrier Rate                                26400
Final   Receive  Carrier Rate                                52000
Protocol Negotiation Result                                  LAPM
Data Compression Result                                      V.42bis
Estimated Signal/Noise Ratio                         (dB)    46
Receive  Signal Power Level                          (-dBm)  33
Transmit Signal Power Level                          (-dBm)  18
Round Trip Delay                                     (msec)  13
Near Echo Level                                      (-dBm)  24
Far  Echo Level                                      (-dBm)  80
Transmit Frame Count                                         0
Transmit Frame Error Count                                   0
Receive  Frame Count                                         0
Receive  Frame Error Count                                   0
Retrain by Local  Modem                                      0
Retrain by Remote Modem                                      0
Rate Renegotiation by Local  Modem                           0
Rate Renegotiation by Remote Modem                           0
Call Termination Cause                                       1
Robbed-Bit Signaling                                         0
Digital Loss                                         (dB)    06
Remote Server ID                                             NA

OK
```

AT Command Set (continued)

Data and General Commands (continued)

I<value>—Request ID Information (continued)

The **ATI11** command may be issued from on-line command mode or after the end of a call. After a call, some of the values are no longer valid.

The following table describes each of the results listed for the **ATI11** command.

Table 10. ATI11 Command Results

Result	Description
Last Connection	V.92, V.90, V.34, or V.32, depending on the type of connection negotiated.
Initial Transmit Carrier Rate	Initial upstream rate.
Initial Receive Carrier Rate	Initial downstream rate.
Final Transmit Carrier Rate	Current or final upstream rate.
Final Receive Carrier Rate	Current or final downstream rate.
Protocol Negotiation Result	LAPM, *MNP* *, or none, depending on V.42 negotiation.
Data Compression Result	LAPM, *MNP*, or none, depending on V.42 negotiation.
Estimated Signal/Noise Ratio	Signal to noise ratio with implied negative. Higher values indicated better conditions.
Receive Signal Power Level (–dBm)	The received signal power, although labeled with units of –dBm, is only a relative measure for comparing calls to/from different locations. This value is valid only during a call.
Transmit Signal Power Level (–dBm)	Upstream transmit signal power.
Round Trip Delay (ms)	Round trip delay in milliseconds.
Near Echo Level (–dBm)	Near echo levels only.
Far Echo Level (–dBm)	Far echo levels only.
Transmit Frame Count	Number of LAPM frames sent upstream during this call. Count wraps around at 65535.
Transmit Frame Error Count	Number of REJ frames received at the analog client modem.
Receive Frame Count	Number of LAPM frames received by the client during this call. Count wraps around at 65535.
Receive Frame Error Count	Number of frames received in error by the client.
Retrain by Local Modem	Number of retrains or rate renegotiations requested by the modem.
Retrain by Remote Modem	Number of retrains or rate renegotiations requested by the remote modem.
Call Termination Cause	Reason for call ending. Only valid after call ends. Result codes are as follows: ■ 0 = local modem command: ATH, DTR drop. ■ 1 = remote modem: cleardown, loss of signal. ■ 2 = no answer, busy, etc. ■ 3 = training failure V.90 or V.34. ■ 4 = protocol failure if required by \N4, for example.
Robbed-Bit Signaling	For PCM connection only, a hexadecimal 6-bit pattern of T1 frames with robbed-bit signaling.
Digital Loss (dB)	For PCM connection only, the downstream digital loss.
Remote Server ID	—

* *MNP* is a trademark of Microcom Systems, Inc.

AT Command Set (continued)

Data and General Commands (continued)

L<value>—Speaker Volume

Use this command to set the monitor speaker volume setting when the speaker is on.

Result codes:

- *OK* if <value> = 0—3.
- *ERROR* if <value> ≠ 0—3.

Table 11. L<value> Commands

Command	Function
L0	Low volume.
L1	Low volume.
L2	Medium volume (default).
L3	High volume.

M<value>—Speaker Control

Use this command to turn the monitor speaker on or off.

Result codes:

- *OK* if <value> = 0—3.
- *ERROR* if <value> ≠ 0—3.

Table 12. M<value> Commands

Command	Function
M0	Speaker is off.
M1	Speaker is on until the modem detects the carrier signal (default).
M2	Speaker is always on when the modem is off-hook.
M3	Speaker is on until the carrier is detected, except when dialing.

N<value>—Modulation Handshake

Use this command to set the modem protocol for handling handshake negotiation at connection time if the communication speed of the remote modem is different from the speed of the local modem.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

AT Command Set (continued)

Data and General Commands (continued)

N<value>—Modulation Handshake (continued)

Table 13. N<value> Commands

Command	Function
N0	When originating or answering, this is for handshake only at the communication standard specified by register S37 (see S37—Dial Line Rate on page 81) and the **B<value>** (see B<value>—Communication Standard Setting on page 9) command.
N1	When originating or answering, begin the handshake only at the communication standard specified by S37 and the **B<value>** command. During handshake, fallback to a lower speed may occur (default).

O<value>—Return to On-Line Data Mode

Use this command to exit on-line command mode and reenter on-line data mode. If the modem is not in on-line command mode when this command is received, it generates an *ERROR* result code.

Result codes:

- *CONNECT* if <value> = 0, 1, 3 and the result code and call progress monitor is set to 0 (**X0**).
- *CONNECT <text>* if <value> = 0, 1, 3 and the result code and call progress monitor is not set to 0 (**X<value>** where <value> = 1—7).
- *NO CARRIER* if the connection is not successfully resumed.
- *ERROR* if <value> ≠ 0—1, 3.

Table 14. O<value> Commands

Command	Function
O0	Instructs the soft modem to exit on-line command mode and return to data mode (see +++Escape Sequence on page 8).
O1	Issues a retrain before returning to on-line data mode.
O3	Issues a rate renegotiation before returning to on-line data mode.

P—Select Pulse Dialing

Use this command to configure the modem for pulse dialing. All subsequent **D<dial string>** commands use pulse dialing until either the **T** command or a tone dial modifier is received by the modem. Tone dialing is the default setting. Do not supply parameters with this command unless it is used as part of a dial modifier.

Q<value>—Result Code Control

Result codes are informational messages sent from the modem and displayed on the monitor. Basic result codes include *OK*, *CONNECT*, *RING*, *NO CARRIER*, and *ERROR*. The **Q<value>** command allows the user to turn result codes on or off.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

AT Command Set (continued)

Data and General Commands (continued)

Q<value>—Result Code Control (continued)

Table 15. Q<value> Commands

Command	Function
Q0	Enables result codes (default).
Q1	Disables result codes.

S<register_number>=<value>—S Register Control

Use this command to view or change an S-register. S-registers contain parameters used by the modem. This command has two forms: one to show the contents of the register and one to change the contents of the register. Some registers are read only and are not affected by the **S<register number>=<value>** command. Each register has a specific function. See S-Registers on page 72.

Result codes:

- *OK* if <register number> is a valid register (see Table 154, S-Register Summary, on page 72).
- *ERROR* if <register number> is not a valid register.

Table 16. S<register_number> Extended Syntax Commands

Syntax	Function
S<register_number>?	Displays register contents.
S<register_number>=<value>	Sets the contents of the register to <value> if the register is not read only.

T—Select Tone Dialing

Use this command to configure the modem for DTMF tone dialing. All subsequent **D<dial string>** commands use tone dialing until either the **P** command or a pulse dial modifier is received by the modem. Tone dialing is the default setting. Do not supply parameters with this command unless it is used as part of a dial modifier.

V<value>—DCE Response Format

Agere Systems soft modem products generate result codes using one of two formats. Verbose mode generates result codes in a text format using words. Numerical mode generates result codes as a number. Each result code has a number assigned to it (see Result Codes on page 70). Use this command to switch between numerical and verbose modes. Call progress and negotiation progress messages are affected by this command.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 17. V<value> Commands

Command	Function
V0	Displays result codes as digits. Numerical mode.
V1	Displays result codes as text (default). Verbose mode.

AT Command Set (continued)

Data and General Commands (continued)

V<value>—DCE Response Format (continued)

Table 18. V<value> Result Code Formats

Command	Result Code Format
V0	<numeric code><CR>
V1	<CR><LF><verbose code><CR><LF>

W<value>—Result Code Option

Use this command to select the modems *CONNECT* message options.

Result codes:

- *OK* if <value> = 0—2.
- *ERROR* if <value> ≠ 0—2.

Table 19. W<value> Commands

Command	Function
W0	*CONNECT* result code reports DTE receive speed. Disables protocol result codes.
W1	*CONNECT* result code reports DTE receive speed. Enables protocol result codes.
W2	*CONNECT* result code reports DCE receive speed. Enables protocol result codes (default).

X<value>—Extended Result Codes Control

Use this command to select which result codes are used by the modem. The parameter of this command is stored in bits 4—6 of register S22.

Table 20. X<value> Commands

Command	Description
X0	Busy detection is disabled; blind dialing (no dial tone detection) is enabled. The following result codes are supported: ■ *OK* ■ *RING* ■ *ERROR* ■ *CONNECT* ■ *NO CARRIER*
X1	Busy detection is disabled; blind dialing (no dial tone detection) is enabled. The following result codes are supported: ■ *OK* ■ *NO CARRIER* ■ *CONNECT <RATE>* ■ *RING* ■ *ERROR*
X2	Busy detection is disabled; blind dialing is disabled. The dialing cannot be conducted unless a dial tone is detected. If dial tone is not detected within the time specified by register S6, the *NO DIAL-TONE* result code will be reported. The following result codes are supported: ■ *OK* ■ *NO CARRIER* ■ *NO DIALTONE* ■ *RING* ■ *ERROR* ■ *CONNECT <RATE>*

AT Command Set (continued)

Data and General Commands (continued)

Table 20. X<value> Commands (continued)

Command	Description
X3	Busy detection is enabled; blind dialing is enabled. The following result codes are supported: ■ *OK* ■ *ERROR* ■ *CONNECT <RATE>* ■ *RING* ■ *BUSY* ■ *BLACKLISTED* ■ *NO CARRIER*
X4	Busy detection is enabled; blind dialing is disabled. The dialing cannot be conducted unless a dial tone is detected. If dial tone is not detected within the time specified by register S6, the *NO DIAL-TONE* result code will be reported. The following result codes are supported: ■ *OK* ■ *NO DIALTONE* ■ *BLACKLISTED* ■ *RING* ■ *BUSY* ■ *WARBLE* ■ *NO CARRIER* ■ *CONNECT <RATE>* ■ *CALL WAITING DETECTED* ■ *ERROR* ■ *DELAYED*
X5	Busy detection is enabled; blind dialing is disabled. The dialing cannot be conducted unless a dial tone is detected. If dial tone is not detected within the time specified by register S6, the *NO DIAL-TONE* result code will be reported. The following result codes are supported: ■ *OK* ■ *BUSY* ■ *DELAYED* ■ *RING* ■ *CONNECT <RATE>* ■ *BLACKLISTED* ■ *NO CARRIER* ■ *RRING* ■ *WARBLE* ■ *ERROR* ■ *NO BONGTONE* ■ *CALL WAITING DETECTED* ■ *NO DIALTONE*

Y<value>—Long-Space Disconnect

This command is supported to ensure compatibility with communication software that issues the **Y0** command. Long-space disconnect is always disabled.

Result codes:

- *OK* if <value> = 0.
- *ERROR* if <value> ≠ 0.

Table 21. Y<value> Commands

Command	Function
Y0	Disables long-space disconnect (default).

AT Command Set (continued)

Data and General Commands (continued)

Z<value>—Reset and Recall Stored Profile

Use this command to force the soft modem to go on-hook and restore a profile saved by the **&W** command. Soft modem products have two stored profiles and the active profile. The <value> parameter selects the stored profile to copy into the active profile.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 22. Z<value> Commands

Command	Function
Z0	Reset and restore stored profile 0.
Z1	Reset and restore stored profile 1.

&B<value>—V.32 Auto Retrain

This command is supported to ensure compatibility with communications software that issues the **B1** command. The **B0** version of this command is not supported. Agere Systems soft modem products always retrain.

Result codes:

- *OK* if <value> = 1.
- *ERROR* if <value> ≠ 1.

Table 23. &B<value> Commands

Command	Function
&B0	Disable V.32 auto-retrain (not supported).
&B1	Enable V.32 auto-retrain (default).

&C<value>—Data Carrier Detect (DCD) Control

Use this command to control the modem's response to receiving a remote modems carrier signal. Data carrier detect (DCD) is a signal from the modem to the DTE indicating that the carrier signal is being received from a remote modem. The modem typically turns off DCD when it no longer detects the remote modems carrier signal.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 24. &C<value> Commands

Command	Function
&C0	Modem ignores the state of the carrier from the remote modem. DCD remains on at all times.
&C1	Modem turns on DCD when the remote modem's carrier signal is detected and turns off DCD when the carrier signal is not detected (default).

AT Command Set (continued)

Data and General Commands (continued)

&D<value>—Data Terminal Ready (DTR) Control

Use this command to set how the soft modem responds to the DTR signal.

Result codes:

- *OK* if <value> = 0—3.
- *ERROR* if <value> ≠ 0—3.

Table 25. &D<value> Commands

Command	Function
&D0	The soft modem ignores the true status of DTR and treats it as always on. Use this selection only if the computer does not provide DTR to the modem.
&D1	If the DTR signal is not detected while in on-line data mode, the modem enters command mode, issues the *OK* result code, and remains connected.
&D2	If the DTR signal is not detected while in on-line data mode, the modem disconnects (default).
&D3*	Reset modem on the on-to-off DTR transition.

* ITU-T Recommendation V.250 (05/99) standardized this command. However, the standard does not include the additional functionality added with the **D3** command.

&F<value>—Restore Factory Default Configuration

Use this command to reset the modem to the configuration programmed at the factory. This operation replaces all of the command options* and S-register settings in the active configuration with factory default values.

Result codes:

- *OK* if <value> = 0.
- *ERROR* if <value> ≠ 0.

Table 26. &F<value> Commands

Command	Function
&F0	Restores factory default configuration.

&G<guard tone>—V.22 *bis* Guard Tone Control

Use this command to select which guard tone, if any, the modem will send while transmitting in the high band (answer mode). This command is only used in V.22 and V.22 *bis* mode. This option is not used in North America; it is for international use only.

Result codes:

- *OK* if <guard tone> = 0—2.
- *ERROR* if <guard tone> ≠ 0—2.

* There are several noted exceptions to this command and caution should be used when determining the state of the command options once this command has been executed.

AT Command Set (continued)

Data and General Commands (continued)

&G<guard tone>—V.22 bis Guard Tone Control (continued)

Table 27. &G<guard tone> Commands

Command	Function
&G0	Disables guard tone (default).
&G1	Selects 550 Hz guard tone.
&G2	Selects 1800 Hz guard tone.

&J<value>—Auxiliary Relay Option

This command is supported to ensure compatibility with communications software that issues the **J0** command.

Result codes:

- *OK* if <value> = 0.
- *ERROR* if <value> ≠ 0.

Table 28. &J<value> Commands

Command	Function
&J0	The auxiliary relay is never closed (default).

&K<value>—Local Flow Control Selection

Use this command to set the soft modem flow control method.

Result codes:

- *OK* if <value> = 0, 3, or 4.
- *ERROR* if <value> ≠ 0, 3, or 4.

Table 29. &K<value> Commands

Command	Function
&K0	Disables flow control.
&K3	Enables RTS/CTS (hardware) flow control (default).
&K4	Enables XON/XOFF flow control.

&M<value>—Asynchronous Communications Mode

This command is supported to ensure compatibility with communication software that issues the **&M0** command. The preferred method for changing the asynchronous communication mode is to use the **\N<error control mode>** command.

Result codes:

- *OK* if <value> = 0.
- *ERROR* if <value> ≠ 0.

AT Command Set (continued)

Data and General Commands (continued)

&M<value>—Asynchronous Communications Mode (continued)

Table 30. &M<value> Commands

Command	Function
&M0	Asynchronous mode (default).

&P<value>—Pulse Dial Make-to-Break Ratio Selection

This command is effective only for Japan.

Result codes:

- *OK* if <value> = 0—2.
- *ERROR* if <value> ≠ 0—2.

Table 31. &P<value> Commands for Domestic Versions

Command	Function
&P0	Selects 39%—61% make/break ratio at 10 pulses per second.
&P1	Selects 33%—67% make/break ratio at 10 pulses per second (default).
&P2	Selects 33%—67% make/break ratio at 20 pulses per second.

&Q<value>—Asynchronous Communications Mode

This command is supported to ensure compatibility with communication software that issues the **&Q<value>** command. The preferred method for changing the asynchronous communication mode is to use the **\N<error control mode>** command.

Result codes:

- *OK* if <value> = 0, 5, 6, 8, or 9.
- *ERROR* if <value> ≠ 0, 5, 6, 8, or 9.

Table 32. &Q<value> Commands

Command	Function
&Q0	Asynchronous mode, buffered. Same as **\N0**.
&Q5	Error control mode, buffered (default). Same as **\N3**.
&Q6	Asynchronous mode, buffered. Same as **\N0**.
&Q8	*MNP* error control mode. If an *MNP* error control protocol is not established, the modem will fall back according to the current user setting in register S36.
&Q9	V.42 or *MNP* error control mode. If neither error control protocol is established, the modem will fall back according to the current user setting in register S36.

AT Command Set (continued)

Data and General Commands (continued)

&S<value>—Data Set Ready (DSR) Option

Use this command to controls DSR action.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 33. &S<value> Commands

Command	Function
&S0	DSR is always on (default).
&S1	DSR comes on after establishing a connection and goes off when the connection ends.

&T<value>—Self-Test Commands

Use this command to perform diagnostic tests on the modem. Each test is designed to isolate a problem location when experiencing periodic data loss or random errors.

Result codes:

- *OK* if <value> = 0.
- *CONNECT* if <value> = 1, 3, or 6.
- *ERROR* if <value> ≠ 0, 1, 3, or 6.

Table 34. &T<value> Commands

Command	Function
&T0	Abort. Terminates the test in progress.
&T1	Initializes local analog loopback, V.56 Loop 3. If a connection exists when this command is issued, the modem hangs up. The modem displays the *CONNECT <rate>* message at the start of the test.
&T3	Local digital loopback test, V.54 Loop2. If no connection exists, the soft modem returns *ERROR*.
&T6	Requests a remote digital loop back, V.54 Loop 2 without self test. If no connection exists, the soft modem returns *ERROR* and generates the *CONNECT<rate>* result code.

AT Command Set (continued)

Data and General Commands (continued)

&V<value>— Display Current Configuration

Use this command to display the current soft modem configuration. The modem maintains two stored profiles and the active profile. This command displays all three configurations and any stored telephone numbers.

Result codes:

- *OK* if <value> = 0.
- *ERROR* if <value> ≠ 0.

The following is an example of the **AT&V0** results.

```
ACTIVE PROFILE:
B1 L2 M1 E1 N1 Q0 V1 W2 X1 Y0 &C1 &D2 &G0 &J0 &K3 &L0 &Q5 &S0 %C3 %E2 \J0
S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:003 S07:060 S08:002
S09:050 S10:014 S11:095 S12:050 S14:138 S18:000 S20:000 S21:048 S22:022
S23:008 S27:073 S28:160 S29:050 S30:000 S31:010 S32:010 S33:000 S35:000
S36:007 S37:000 S38:002 S39:003 S40:040 S41:107 S42:001 S43:001 S48:007
S49:027 S50:015 S51:095 S52:007 S53:047 S54:002 S55:035 S56:000 S57:000
S58:030 S60:255 S61:000 S62:000 S63:030 S70:000 S83:005 S90:000 S91:010
S92:010 S93:006 S94:000 S95:129

STORED PROFILE 0:
B1 L2 M1 E1 N1 Q0 V1 W2 X1 Y0 &C1 &D2 &G0 &J0 &K3 &L0 &Q5 &S0 %C3 %E2 \J0
S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:003 S07:060 S08:002
S09:050 S10:014 S11:095 S12:050 S14:138 S18:000 S20:000 S21:048 S22:022
S23:008 S27:073 S28:160 S29:050 S30:000 S31:010 S32:010 S33:000 S35:000
S36:007 S37:000 S38:002 S39:003 S40:040 S41:107 S42:001 S43:001 S48:007
S49:027 S50:015 S51:095 S52:007 S53:047 S54:002 S55:035 S56:000 S57:000
S58:030 S60:255 S61:000 S62:000 S63:030 S70:000 S83:005 S90:000 S91:010
S92:010 S93:006 S94:000 S95:129

STORED PROFILE 1:
B1 L2 M1 E1 N1 Q0 V1 W2 X1 Y0 &C1 &D2 &G0 &J0 &K3 &L0 &Q5 &S0 %C3 %E2 \J0
S00:002 S01:000 S02:043 S03:013 S04:010 S05:008 S06:003 S07:060 S08:002
S09:050 S10:014 S11:095 S12:050 S14:138 S18:000 S20:000 S21:048 S22:022
S23:008 S27:073 S28:160 S29:050 S30:000 S31:010 S32:010 S33:000 S35:000
S36:007 S37:000 S38:002 S39:003 S40:040 S41:107 S42:001 S43:001 S48:007
S49:027 S50:015 S51:095 S52:007 S53:047 S54:002 S55:035 S56:000 S57:000
S58:030 S60:255 S61:000 S62:000 S63:030 S70:000 S83:005 S90:000 S91:010
S92:010 S93:006 S94:000 S95:129

TELEPHONE NUMBERS:
0 = 5557107
1 = 5557106
2 =
3 =

OK
```

AT Command Set (continued)

Data and General Commands (continued)

&W<value>—Store Current Configuration

Use this command to store the modems command options and all S registers except S3, S4, and S5. The **Z<value>** command or a powerup reset, of the modem, restores this profiles.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 35. &W<value> Commands

Command	Function
&W0	Stores the current configuration as profile 0.
&W1	Stores the current configuration as profile 1.

&Y<value>—Select Stored Profile for Hard Reset

This command does not change the behavior of the modem but is included for compatibility with applications that issue the **&Y** command.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

&Z<storage location>=<dialing sting>—Store Telephone Number

Use this command to store a dialing string. Agere Systems soft modem products can save four dialing strings. The dial string may contain up to 34 characters. The **ATDS=<storage location>** command (see D<dial string>—Dial on page 9) dials using the stored string.

Result codes:

- *OK* if <storage location> = 0—3.
- *ERROR* if <storage location> ≠ 0—3.

\A<value>—Select Maximum *MNP* Block Size

The modem will operate an *MNP* error corrected link using a maximum block size controlled by the parameter supplied.

Result codes:

- *OK* if <value> = 0—3.

Table 36. *ERROR* if <value> ≠ 0—3.**\A<value> Commands**

Command	Function
\A0	64 characters.
\A1	128 characters.
\A2	192 characters.
\A3	256 characters (default).

AT Command Set (continued)

Data and General Commands (continued)

\B<break time>—Send Break

Use this command in non-error-controlled mode. It instructs the modem to transmit a break signal to the remote modem. The minimum break length is 100 ms and the maximum break length is 900 ms. The <break time> parameter has values between one and nine with each increment representing 100 ms.

The command works in conjunction with the **\K** command (see \K<value>—Set Break Control on page 27).

Result codes:

- *OK* if <break time> = 1—9 and connected in data modem mode.
- *ERROR* if <break time> ≠ 1—9.
- *NO CARRIER* if not connected or if connected in FAX modem mode. This result is contingent upon have a valid <break time>.

\G<value>—Modem Port Flow Control

Instructs the DCE to process XON/XOFF flow control or pass XON/OFF flow control to the remote DCE.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 37. \G<value> Commands

Command	Function
\G0	The modem processes XON/XOFF flow control characters locally (default).
\G1	The modem passes XON/XOFF flow control characters.

\J<value>—Adjust Bits/s Rate Control

Use this command to specify whether or not the negotiated connect speed of the modem forces the adjustment of the speed of the DTE to the modem's speed.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 38. \J<value> Commands

Command	Function
\J0	Buffer mode. Error control is set or disabled with the **\N<value>** command (default).
\J1	Forces the maximum DCE rate to the DTE rate.

AT Command Set (continued)

Data and General Commands (continued)

\K<value>—Set Break Control

Use this command to control the response of the modem to a break received from the DTE, remote modem, or the **\B<value>** command.

Result codes:

- *OK* if <value> = 0—5.
- *ERROR* if <value> ≠ 0—5.

The response is different in three separate cases. The first case is where the modem receives a break from the DTE when it is operating in data transfer mode. See Table 39.

Table 39. \K<value> Commands When Modem Is Operating in Data Transfer Mode

Command	Function
\K0, \K2, K4	Enter on-line command mode. No break is sent to the remote modem.
\K1	Clears data buffers and sends a break to the remote modem.
\K3	Sends a break to the remote modem immediately.
\K5	Sends a nondestructive, non expedited break to the remote modem (default).

The second case, shown in Table 40, occurs when the modem is in the on-line command state (waiting for AT commands) during a data connection, and the **\B<value>** command is received in order to send a break to the remote modem.

Table 40. \K<value> Commands When Modem Is On-Line Command State During Data Connection

Command	Function
\K0, \K1	Clears data buffers and sends a break to the remote modem.
\K2, \K3	Sends a break to the remote modem immediately.
\K4, \K5	Sends a break to the remote modem in sequence with data (default).

Finally, the third case occurs when a break is received from a remote modem during a connection. These commands are shown in Table 41.

Table 41. \K<value> Commands When Break Is Received During Connection

Command	Function
\K0, \K1	Clears data buffers and sends a break to the DTE.
\K2, \K3	Sends a break to the DTE immediately.
\K4, \K5	Sends a break to the DTE in sequence with received data (default).

AT Command Set (continued)

Data and General Commands (continued)

\N<error_control>—Select Error Control Mode

Use this command to select the type of error control used by the modem when sending or receiving data.

Result codes:

- *OK* if <error_control> = 0—5, or 7.
- *ERROR* if <error_control> ≠ 0—5, or 7.

Table 42. \N<value> Commands

Command	Function
\N0	Buffer mode. No error control (same as **&Q6**).
\N1	Direct mode.
\N2	*MNP* or disconnect mode. The modem attempts to connect using *MNP* 2—4 error control procedures. If this fails, the modem disconnects. This is also known as *MNP* reliable mode.
\N3	V.42, MNP, or buffered (default). The modem attempts to connect in V.42 error control mode. If this fails, it will attempt to connect in *MNP* mode. If this also fails, soft modem connects in buffer mode and continues operation. This is also known as V.42/*MNP* auto reliable mode (same as **&Q5**).
\N4	V.42 or disconnect. The modem attempts to connect in V.42 error control mode. If this fails, the modem disconnects.
\N5	V.42, *MNP*, or buffered (same as **\N3**).
\N7	V.42, *MNP*, or buffered (same as **\N3**).

\Q<value>—Local Flow Control Selection

Use this command to set the local flow control method.

Result codes:

- *OK* if <value> = 0—1, or 3.
- *ERROR* if <value> ≠ 0—1, or 3.

Table 43. \Q<value> Commands

Command	Function
\Q0	Disables flow control (same as **&K0**).
\Q1	XON/XOFF software flow control (same as **&K4**).
\Q3	RTS/CTS to DTE (same as **&K3**) (default).

AT Command Set (continued)

Data and General Commands (continued)

\R<value>—Ring Indicator Signal Off After Answer

This command is supported to ensure compatibility with communications software that issues the **\R0** command.

Result codes:

- *OK* if <value> = 0.
- *ERROR* if <value> ≠ 0.

Table 44. \R<value> Commands

Command	Function
\R0	Ring indicator signal is off after the telephone call is answered.

\T<time delay>—Inactivity Timer

Use this command to specify the delay time used by the inactivity timer. The delay time is the length of time in minutes that the modem waits during periods of inactivity before disconnecting. Periods of inactivity are defined by no data being sent or received by the DCE. To disable the inactivity timer, use the **T0** command. The delay time may also be specified in register S30 (see S30—Inactivity Timer on page 80).

This function is only applicable in buffer mode.

Result codes:

- *OK* if <time delay> = 0—255.
- *ERROR* if <time delay> ≠ 0—255.

Table 45. \T<value> Commands

Command	Function
\T0	Inactivity timer disabled (default).
\T1—\T255	Specifies the length of time in minutes that the modem will wait before disconnecting when no data is sent or received.

\V<value>—Protocol Result Code

Use this command to enable or disable protocol result codes.

Result codes:

- *OK* if <value> = 0—2.
- *ERROR* if <value> ≠ 0—2.

Table 46. \V<value> Commands

Command	Function
\V0	Disables protocol result code appended to DCE speed.
\V1	Enables protocol result code appended to DCE speed (default).
\V2	Enables protocol result code appended to DCE speed (same as **\V1**).

AT Command Set (continued)

Data and General Commands (continued)

%B—View Numbers in Blacklist

If blacklisting is in effect, this command displays the numbers that are currently blacklisted, failed, or delayed. The *ERROR* result code appears for countries that do not support blacklisting.

%C<value>—Data Compression Control

Use this command to enable or disable V.42 *bis* and *MNP* class 5 data compression. On-line changes do not take effect until a disconnect occurs.

Result codes:

- *OK* if <value> = 0—1.
- *ERROR* if <value> ≠ 0—1.

Table 47. %C<value> Commands

Command	Function
%C0	V.42 bis/*MNP* 5 disabled. No data compression.
%C3	V.42 bis/*MNP* 5 enabled. Data compression enabled (default).

%E<value>—Auto Fallback/Fallforward Control

This command provides the option for the modem to automatically monitor line quality, to fall back when line quality is insufficient, and to fall forward when line quality is sufficient.

Result codes:

- *OK* if <value> = 0—2.
- *ERROR* if <value> ≠ 0—2.

Table 48. %E<value> Commands

Command	Function
%E0	Disables fallback/fallforward.
%E1	Enables fallback and disable fallforward.
%E2	Enables fallback/fallforward (default).

-C<value>—Data Calling Tone

Use this command to enable or disable the data calling tone after a call is originated. The data calling tone is a tone of a certain frequency and cadence as specified in V.25 which allows remote data/FAX/voice discrimination. The frequency is 1300 Hz with a cadence of 0.5 s on and 2.0 s off.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

AT Command Set (continued)

Data and General Commands (continued)

-C<value>—Data Calling Tone (continued)

Table 49. -C<value> Commands

Command	Function
-C0	Disabled (default).
-C1	Enabled.

-V90=<rate>—Enable/Disable V.90 Settings

Result codes:

- *OK* if <rate> = 0—23.
- *ERROR* if <rate> ≠ 0—23.

Table 50. -V90 Commands

Command	Function
-V90=<rate>	Controls the downstream rate. See Table 51 for the possible values of <rate>.
-V90=0	Disables V.90.
-V90=1	Enables V.90 auto rate (default).
-V90?	Displays the current value.
-V90=?	Shows the range of <rate>.

Table 51. -V90=<rate> Equivalent Downstream Rates

<rate> Value	Downstream Rate	<rate> Value	Downstream Rate
0	V.90 disabled.	12	41333 kbits/s.
1	Auto rate (default).	13	42666 kbits/s.
2	28000 kbits/s.	14	44000 kbits/s.
3	29333 kbits/s.	15	45333 kbits/s.
4	30666 kbits/s.	16	46666 kbits/s.
5	32000 kbits/s.	17	48000 kbits/s.
6	33333 kbits/s.	18	49333 kbits/s.
7	34666 kbits/s.	19	50666 kbits/s.
8	36000 kbits/s.	20	52000 kbits/s.
9	37333 kbits/s.	21	53333 kbits/s.
10	38666 kbits/s.	22	54666 kbits/s.
11	40000 kbits/s	23	56000 kbits/s.

AT Command Set (continued)

Data and General Commands (continued)

+A8E=<v8o>,<v8a>,<v8cf>,<v8b>—V.8 and V.8 *bis* Operation Controls

Use this command to set the control parameters for early call negotiation through V.8 and V.8 *bis*. **+A8E*** may also be used as an action command to reinitiate V.8 or V.8 *bis* if an earlier attempt to use either protocol has failed.

<v8o> enables or disables DCE-controlled V.8 origination negotiation; <v8a> enables or disables DCE-controlled V.8 answer negotiation; <v8b> disables V.8 negotiation or sets it to DCE controlled or DTE controlled negotiation. The <a8cf> parameter sets the V.8 CI signal call function to the value specified. The valid range for this parameter is 0—FF, with a default of 0xC1.

Result codes:

- *OK* if <v8o> = 1, 6 and <v8a> = 1, 5 and <v8cf> = 0—FF and <v8b> = 0—2.
- *ERROR* if <v8o> ≠ 1, 6 or <v8a> ≠ 1, 5 or <v8cf> ≠ 0—FF or <v8b> ≠ 0—2.

The following parameter values are supported when V.80 is enabled.

Table 52. Valid <v8o> Values

Value	Description
1	Enables DCE-controlled V.8 origination negotiation (default).
6	Enables DCE-controlled V.8 origination negotiation, issue +A8x indications.

Table 53. Valid <v8a> Values

Value	Description
1	Enables DCE-controlled V.8 answer negotiation (default).
5	Enables DCE-controlled V.8 answer negotiation, issue +A8x indications.

Table 54. Valid <v8cf> Values

Value	Description
1	Enables DCE-controlled V.8 origination negotiation.
6	Enables DCE-controlled V.8 origination negotiation, issue +A8x indications.

Table 55. Valid <v8b> Values

Value	Description
0	Disables V.8 negotiation.
1	Enables DCE-controlled V8 *bis* negotiation (default).
2	Enables DTE-controlled V.8 negotiation.

Table 56. +A8E Extended Syntax Commands

Command	Description
+A8E=<v8o>,<v8a>,<v8cf>,<v8b>	Sets the parameters used by the modem during V.8 negotiation.
+A8E?	Displays the current settings for V.8 or V.8 *bis* negotiation.
+A8E=?	Displays the supported parameter values for the A8E commands.

* ITU-T recommendation V.251 (02/98) standardized this command. However, the soft modem command set only includes partial support for the standard. For complete detail of the standard form of this command refer to recommendation V.251.

AT Command Set (continued)

Data and General Commands (continued)

+A8T=<signal>,<1st_message>,<2nd_message>,<sig_en>,<msg_en>,<supp_delay>—Send V.8 *bis* Signal and/or Message

This command instructs the DCE to send a V.8 *bis* signal or message. This command is only supported when V.80 is enabled.

Result codes:

- *OK* if <signal> = 0—10 and <sig_en> = 0, 1 and <msg_en> = 0, 1 and <supp_delay> = 0,1.
- *ERROR* if <signal> ≠ 0—10 or <sig_en> ≠ 0, 1 or <msg_en> ≠ 0, 1 or <supp_delay> ≠ 0,1.

Table 57. Valid <signal> Values

Value	Meaning
0	None.
1	Initiating Mre.
2	Initiating MRd.
3	Initiating CRe, low power.
4	Initiating CRe, high power.
5	Initiating CRd.
6	Initiating Esi.
7	Responding MRd, low power.
8	Responding MRd, high power.
9	Responding CRd.
10	Responding Esr.

Table 58. Valid <sig_en> Values

Value	Meaning
0	Enables detection of initiation signals (default).
1	Enables detection or responding signals.

Table 59. Valid <msg_en> Values

Value	Meaning
0	Disables detection of messages (default).
1	Enables detection of V.8 *bis* messages.

Table 60. Valid <supp_delay> Values

Value	Meaning
0	No delay inserted (default).
1	Inserts a 1.5 s delay between transmitted V.8 *bis* signal and the subsequent V.8 *bis* message.

AT Command Set (continued)

Data and General Commands (continued)

+A8T=<signal>,<1st_message>,<2nd_message>,<sig_en>,<msg_en>,<supp_delay>—Send V.8 bis Signal and/or Message (continued)

Table 61. +A8T Extended Syntax Commands

Command	Description
+A8T=<signal>,<1st_message>, <2nd_message>,<sig_en>,<msg_en>,<supp_delay>	Sends a V.8 *bis* command or message.
+A8T?	Displays the current configuration for sending a V.8 *bis* message or command.
+A8T=?	Displays the supported configuration parameters.

+DR<value>—Data Compression Reporting

Use this command to enable or disable the compression report. If the compression report is enabled, the *+DR:<type>* intermediate result code reports the current DCE-DCE data compression type. It is issued after the error control report (+ER) and before the final result code (e.g., *CONNECT*).

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 62. +DR Data Compression Report Value

Command	Function
+DR=0	This command disables the compression report.
+DR=1	This command enables the compression report.

Table 63. +DR Data Compression Reporting Intermediate Result Codes

Result Code	Description
+DR: NONE	Data compression is not in use.
+DR: V42B	V.42 *bis* is in use in both directions.
+DR: V42B RD	V.42 *bis* is in use in the receive direction.
+DR: V42B TD	V.42 *bis* is in use in the transmit direction.
+DR: V44	V.44 is in use in both directions.
+DR: V44 RD	V.44 is in use in the receive direction.
+DR: V44 TD	V.44 is in use in the transmit direction.

Table 64. +DR Extended Syntax Commands

Command	Description
+DR=<value>	Turns the data compression report result code on or off.
+DR?	Displays the current status of the data compression report result code.
+DR=?	Displays all of the supported values for the <value> parameter.

AT Command Set (continued)

Data and General Commands (continued)

+DS=<direction>,<compression_negotiation>,<max_dict>,<max_string>—V.42 *bis* Data Compression

Use the **+DS** command to configure the V.42 *bis* data compression method used by the modem. The settings of this command overwrite the setting of a **%C<value>** command. However, it can also be overwritten by **%C<value>** command.

Result codes:

- *OK* if <direction> = 0—3 and <compression negotiation> = 0 and <max_dict> = 512, 1024, 2048 and <max_string> = 6—32.
- *ERROR* if <direction> ≠ 0—3 or <compression negotiation> ≠ 0 or <max_dict> ≠ 512, 1024, 2048 or <max_string> ≠ 6—32.

The <direction> parameter sets which directions use the compression method. Agere Systems soft modem products use compression in one or both directions.

Table 65. Valid <direction> Values

Value	Meaning
0	Modem negotiates no V.42 *bis* compression.
1	Modem negotiates transmit only V.42 *bis* compression.
2	Modem negotiates receive only V.42 *bis* decompression.
3	Modem accepts V.42 *bis* compression in both or either direction (default).

The <compression_negotiation> parameter tells the modem whether it should disconnect if V.42 negotiations fail. The soft modem AT command set does not support the disconnect feature when V.42 negotiation fails and the <compression_negotiation> parameter is always set to 0. The <max_dict> and <max_string> parameters specify the maximum number of dictionary entries and maximum string length for the modem to negotiate. Their default values are 4096 and 32, respectively.

Table 66. +DS Extended Syntax Commands

Command	Description
+DS=<direction>,<0>,<max_dict>,<max_string>	Configures modem V.42 compression method.
+DS?	Displays the current V.42 compression configuration.
+DS=?	Displays the supported V.42 compression setting.

+DS44=<direction>,<compression_negotiation>, <capability>, <max_codewords_tx>, <max_codewords_rx>,<max_string_tx>,<max_string_rx>,<max_history_tx>,<max_history_rx>— V.44 Data Compression

Use this command to configure the V.44 data compression method used by the modem. Agere Systems soft modem products never disconnect if V.44 is not negotiated and always use the streaming method for data transfers. As a result, <compression_negotiation> and <capability> are always 0.

AT Command Set (continued)

Data and General Commands (continued)

+DS44=<direction>,<compression_negotiation>, <capability>, <max_codewords_tx>, <max_codewords_rx>,<max_string_tx>,<max_string_rx>,<max_history_tx>,<max_history_rx>— V.44 Data Compression (continued)

Result codes:

- *OK* if <direction> = 0—3, and <compression_negotiation> = 0, and <capability> = 0, and <max_codewords_tx> = 512, 1024, 2048, and <max_codewords_rx> = 512, 1024, 2048, and <max_history_tx> = 1024, 2048, 4096, 1536, 3072, 6144, and <max_history_rx> = 1024, 2048, 4096, 1536, 3072, 6144.
- *ERROR* if <direction> ≠ 0—3, or <compression_negotiation> ≠ 0, or <capability> ≠ 0, or <max_codewords_tx> ≠ 512, 1024, 2048, or <max_codewords_rx> ≠ 512, 1024, 2048, or <max_history_tx> ≠ 1024, 2048, 4096, 1536, 3072, 6144, or <max_history_rx> ≠ 1024, 2048, 4096, 1536, 3072, 6144.

The <direction> parameter sets which directions use the compression method. Agere Systems soft modem products use compression in one or both directions.

Table 67. Valid <direction> Values

Value	Meaning
0	Modem negotiates no V.44 compression.
1	Modem negotiates transmit only V.44 compression.
2	Modem negotiates receive only V.44 decompression.
3	Modem accepts compression in both or either direction (default).

The <max_codewords_tx> parameter specifies the maximum number of code words to negotiate in the transmit direction. The <max_codewords_rx> parameter specifies the maximum number of code words to negotiate in the receive direction.

Table 68. Valid <max_codewords_tx> and <max_codewords_rx> Values

Value	Meaning
2048	Default <max_codewords_tx> and <max_codewords_rx> value.
512, 1024, 2048	Valid transmit and receive code word settings.

The <max_string_tx> parameter specifies the maximum string length to negotiate in the transmit direction. The <max_string_rx> parameter specifies the maximum string length to negotiate in the receive direction.

Table 69. Valid <max_string_tx> and <max_string_rx> Values

Value	Meaning
255	Default <max_string_tx> and <max_string_rx> value.
32—255	Valid transmit and receive string lengths.

AT Command Set (continued)

Data and General Commands (continued)

+DS44=<direction>,<compression_negotiation>, <capability>, <max_codewords_tx>, <max_codewords_rx>,<max_string_tx>,<max_string_rx>,<max_history_tx>,<max_history_rx>— V.44 Data Compression (continued)

The <max_history_tx> parameter specifies the maximum length of the history buffer to negotiate in the transmit direction. The <max_history_rx> parameter specifies the maximum length of the history buffer to negotiate in the receive direction.

Table 70. Valid <max_history_tx> and <max_history_rx> Values

Value	Meaning
6144	Default <max_history_tx> and <max_history_rx> value.
1024, 2048, 4096, 1536, 3072, 6144	Valid maximum transmit and receive history buffer sizes.

Table 71. +DS44 Extended Syntax Commands

Command	Description
+DS44=<direction>,<0>,<0><max_code_words_tx>,<max_code_words_rx>,<max_string_tx>,<max_string_tx>,<max_sting_rx>, <max_history_tx>,<max_history_rx>	Configures modem V.44 compression method.
+DS44?	Displays the current V.44 compression configuration.
+DS44=?	Displays the supported V.44 compression setting.

+EB=<break_selection>,<timed>,<default_length>—Break Handling In Error Control Operation

Use this command to set the modem behavior when a BREAK is received. The <break_selection> parameter sets the type of break sent to the remote DCE when a break is received from the local DTE. The <timed> parameter sets wether the V.42 L-SIGNAL send the break length. The <default_length> parameter sets the length of the break sent to the local DTE when the modem receives a break from the remote DTE that does not have a defined break length. The <default_length> is defined in milliseconds and has a default value of 30 (30 ms).

Result codes:

- *OK* if <break_selection> = 0—3 and <timed> = 0, 1 and <default_length> = 0—255 in increments of 10.
- *ERROR* if <break_selection> ≠ 0—3 or <timed> ≠ 0, 1 or <default_length> ≠ 0—255 in increments of 10.

Table 72. Valid <break_selection> Values

Value	Meaning
0	Ignore break (default).
1	Non expedited, nondestructive.
2	Expedited, nondestructive.
3	Expedited, destructive.

* ITU-T recommendation V.250 (05/98) standardized this command. The standard version includes two additional parameters that are not included in the soft modem command set. For more information on the standardized version of this command, refer to ITU-T recommendation V.250.

AT Command Set (continued)

Data and General Commands (continued)

+EB=<break_selection>,<timed>,<default_length>—Break Handling In Error Control Operation (continued)

Table 73. Valid <timed> Values

Value	Meaning
0	V.42 L-SIGNAL does not indicate break signal length.
1	V.42 L-SIGNAL indicates break signal length.

Table 74. Valid <default_length> Values

Value	Meaning
0	Modem does not deliver a break to the DTE.
1—255	Modem delivers a break of the length set by the <default_length> parameter.

Table 75. +EB Extended Syntax Commands

Command	Description
+EB=<break selection>,<timed>, <default length>	Sets the modem behavior when a break is received.
+EB?	Displays the current break selection settings.
+EB=?	Displays the supported break selection settings.

+EFRAM=<value 1>,<value 2>—Frame Length

Use this command to set the maximum link-layer frame information field size that the soft modem attempts to establish. <value 1> defines the field size for the sending direction in octets. <value 2> defines the field size for the receiving direction in octets and is not required.

Result codes:

- *OK* if <value 1> = 8, 16, 32, 64, 128, 256 and <value 2> = 0
- *ERROR* if <value 1> ≠ 8, 16, 32, 64, 128, 256 or <value 2> ≠ 0

Table 76. +EFRAM Extended Syntax Commands

Command	Description
+EFRAM=<value 1>,<value 2>	Sets the link-layer frame fields size.
+EFRAM?	Displays the current maximum link layer frame field size settings.
+EFRAM=?	Displays the supported maximum frame sizes.

AT Command Set (continued)

Data and General Commands (continued)

+ER=<value>—Error Control Reporting

Use this command to turn on or turn off the error control report. If the compression report is enabled, the *+ER:<type>* intermediate result code reports the current DCE-DCE error control type. It is issued after the determination of the error control protocol and before the final result code (e.g., *CONNECT*). Specifically, the **+ER** intermediate result code is issued after the modulation report (**+MCR** and **+MRR**) and before the data compression report (**+DR**).

The compression report format is shown in Table 78.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 77. +ER Control Reporting Commands

Command	Function
+ER=0	This command enables error control report (default).
+ER=1	This command disables error control report.

Table 78. +ER Error Control Reporting Intermediate Result Codes

Result Code	Description
+ER: NONE	Data compression not in use.
+ER: LAPM	V.42 LAPM protocol is in use.
+ER: ALT	V.42 alternative protocol is in use.

Table 79. +ER Extended Syntax Commands

Command	Description
+ER=<value>	Enables or disables error control reporting.
+ER?	Displays the current setting for error control reporting.
+ER=?	Displays the supported error control reporting settings (0, 1).

+ES=<orig_rqst>,<orig_fbk>,<ans_fbk>—Error Control Selection

Use this command to select the error correction mode. If the modem is operated in V.80 mode (synchronous buffered mode), and **+ES=,,8,** the **+ES?** will always return **+ES: 6,,8**. The setting of this command overwrites the **\N** command. However, the **+ES** command is overwritten by the setting on a **\N** command.

Result codes:

- *OK* if one of the combinations shown in Table 80.
- *ERROR* all other parameter combinations.

AT Command Set (continued)

Data and General Commands (continued)

+ES=<orig_rqst>,<orig_fbk>,<ans_fbk>—Error Control Selection (continued)

Agere Systems soft modems support the following parameter combinations.

Table 80. +ES Combinations

Combination	Mode
+ES=1,0,1	Buffered mode.
+ES=0,1,0	Direct mode.
+ES=4,4,6	*MNP* or disconnect mode.
+ES=3,3,5	LAPM or disconnect mode.
+ES=4,0,6	*MNP* or buffered mode.
+ES=3,0,2	LAPM, *MNP*, or buffered mode (default).
+ES=2,0,2	LAPM or buffered mode.
+ES=3,2,4	LAPM, *MNP*, or disconnect mode.
+ES=,,8	V.42 sync buffer mode (V.80 enabled).
+ES=6,,8	V.42 sync buffer mode (V.80 enabled).

Table 81. +ES Extended Syntax Commands

Command	Description
+ES=<value>	Selects the modem error control method.
+ES?	Displays the current error control settings.
+ES=?	Displays the supported error control settings.

+ESR=<value>—Selective Repeat

Use this command to enable or disable the selective reject mode*.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 82. +ESR Parameter Values

Command	Description
0	Enables the selective reject mode.
1	Disables the selective reject mode.

Table 83. +ESR Extended Syntax Commands

Command	Description
+ESR=<value>	Turns on or turns off the selective reject mode.
+ESR?	Displays the current settings for the selective reject mode.
+ESR=?	Displays the supported settings for the selective reject mode.

* Refer to ITU- T recommendation V.42 for a complete definition of the selective reject mode.

AT Command Set (continued)

Data and General Commands (continued)

+ETBM=<pending_TD>,<pending_RD>,<timer>—Call Termination Buffer Management

Use this command to set the behavior of the modem during call termination. The <pending_TD> parameter controls how previously-transmitted data remaining in the DCE buffers is handled when the DTE request a disconnect from the call. The <pending_RD> parameter controls how previously-received data remaining in the DCE buffers is handled when the remote DCE disconnects the call. The <timer> parameter sets the maximum amount of time the soft modem will attempt to deliver the buffered data before abandoning the attempt and discarding any remaining data.

Result codes:

- *OK* if <pending_TD> = 0—2 and <pending RD> = 0—2 and <timer> = 0—254.
- *ERROR* if <pending_TD> ≠ 0—2 or <pending RD> ≠ 0—2 or <timer> ≠ 0—254.

Table 84. <pending_TD> Parameter Values

Value	Description
0	Modem discards all buffered data immediately and disconnects.
1	Modem ignores the timer and attempts to deliver the data until it is acknowledged. If the remote DCE disconnects, discard the remaining data.
2	Modem attempts to deliver the data until the data is acknowledged. If the remote DCE disconnects, or the timer expires, discard the remaining data.

Table 85. <pending_RD> Parameter Values

Value	Description
0	Modem discards all buffered data immediately and disconnects.
1	Modem ignores the timer and attempts to deliver the data until it is acknowledged. If the local DTE request a disconnect, discard the remaining data.
2	Modem attempts to deliver the data until the data is acknowledged. If the local DTE request a disconnect, or the timer expires, discard the remaining data.

Table 86. <timer> Parameter Values

Value	Description
0	Modem does not attempt to deliver data.
1—254	Modem attempts to deliver data for the amount of time set by the <timer> parameter.

Table 87. +ETBM Extended Syntax Commands

Command	Description
+ETBM=<pending_TD>,<pending_RD>,<timer>	Sets the modem behavior during call termination.
+ETBM?	Displays the current settings for call termination behavior.
+ETBM=?	Displays the supported settings for call termination behavior.

AT Command Set (continued)

Data and General Commands (continued)

+EWIND=<value_1>,<value_2>—Window Size

Use this command to set the maximum number of acknowledged frames allowed at the link layer. Changes set by the command take effect when the next connection is established. <value_1> sets the maximum window size for the transmit direction and <value_2> sets the maximum window size for the receive direction. The default value for <value_1> is 15.

Result codes:

- *OK* if <value_1> = 1—31 and <value_2> = 0.
- *ERROR* if <value_1> ≠ 1—31 or <value_2> ≠ 0.

Table 88. +EWIND Extended Syntax Commands

Command	Description
+EWIND=<value_1>,<value_2>	Sets the maximum link layer window size.
+EWIND?	Displays the current maximum link layer window size.
+EWIND=?	Displays the supported maximum link layer window sizes.

+FCLASS=<value>—Service Class Indication

Use this command to set the modem service class. The service class determines if the modem is in data, FAX. The **+FCLASS** command is an extended syntax command.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* <value> ≠ 0, 1.

Table 89. +FCLASS Values

Commands	Description
+FCLASS=0	Selects the modems data mode.
+FCLASS=1	Selects the modems class 1 fax mode.

Table 90. +FCLASS Extended Syntax Commands

Command	Description
+FCLASS=<value>	Selects the class or mode of the modem.
+FCLASS?	Displays the current class or mode.
+FCLASS=?	Displays the available parameter values for the **+FCLASS** command.

AT Command Set (continued)

Data and General Commands (continued)

+GCAP—Request Complete Capabilities List

Use this command to display a list of the soft modems capabilities. This is an extended syntax command but it has only one form, **+GCAP**.

Table 91. +GCAP Responses

+GCAP Responses*	DCE Control Standard	Description
+FCLASS	T.class 1, +F	Class 1 FAX DCE control
+MS	+M commands	Modulation control: ■ +MS ■ +MR
+ES	+E commands	Error control: ■ +ES ■ +EFCS ■ +EB ■ +ETBM ■ +ER
+DS	+D commands	Data compression ■ +DS ■ +DR

* ITU-T recommendation V.250 (05/99) identifies an additional response (+MV18S) that is not included with Agere System soft modem products. +MV18S is for V.18 modulation control. For more information refer to ITU-T recommendation V.250 (05/99).

+GCI=<T.35_country_code>—Country of Installation

Use this command to set the modem country code. ITU-T Recommendation T.35 defines the country codes and the country names. Table 170 on page 88 has a complete list of the T.35 country codes.

Result codes:

- *OK* if <T.35_country_code> = valid country code as defined by Table 170.
- *ERROR* if <T.35_country_code> ≠ valid country code as defined by Table 170.

Table 92. +GCI Extended Syntax Commands

Command	Description
+GCI=<T.35_country_code>	Set the country code.
+GCI?	Display the current country code setting.
+GCI=?	Display all supported country code settings.

AT Command Set (continued)

Data and General Commands (continued)

+GMI—Manufacturer Identification

+GMI is an extended syntax command. It returns the modem manufacturer and either the *OK* or *ERROR* result code. The **+GMI=?** syntax returns an *ERROR* result code. The other two forms return an *OK* result code.

Result codes:

- *OK* when using the **+GMI** or **+GMI?** syntax.
- *ERROR* when using the **+GMI=?** syntax.

Table 93. +GMI Extended Syntax Commands

Command	Description
+GMI, **+GMI?**	Display modem manufacturer and generates an *OK* result code.
+GMI=?	Display modem manufacturer and generates an *ERROR* result code.

+GMM—Modem Identification

This command is supported to ensure compatibility with communication software that issues the **+GMM** command. The **+GMM** command returns the string "H.324 video ready rev 1.0."

Result codes:

- *OK* when using the **+GMM** or **+GMM?** syntax.
- *ERROR* when using the **+GMM=?** syntax.

Table 94. +GMM Extended Syntax Commands*

Command	Description
+GMM, **+GMM?**	Displays "H.324 video ready rev 1.0."

* ITU-T recommendation V.250 standardized this command. The standard version did not include the extended syntax version included with the soft modem version of the +GMM commands. For more information see recommendation V.250.

+GMR—Request Revision Information

This command returns the version of the modem code.

Result codes:

- *OK* when using the **+GMR** or **+GMR?** syntax.
- *ERROR* when using the **+GMR=?** syntax.

Table 95. +GMR Extended Syntax Commands

Command	Description
+GMR, **+GMR?**	Displays the version and revision information followed by the *OK* result code.
+GMR=?	Displays the version and revision information followed by the *ERROR* result code.

AT Command Set (continued)

Data and General Commands (continued)

+GOI—Request Global Object Identification

This command returns the ISO registration object identifier.

Result codes:

- *OK* when using the **+GOI** syntax.
- *ERROR* when using the **+GOI=?** or **+GOI?** syntax.

Table 96. +GOI Extended Syntax Commands

Command	Description
+GOI	Displays the ISO registration object identifier followed by the *OK* result code.
+GOI=?, **+GOI?**	Displays the ISO registration object identifier followed by the *ERROR* result code.

+GSN—Request Product Serial Number Identification

This command returns the product serial number.

Result codes:

- *OK* when using the **+GSN** syntax.
- *ERROR* when using the **+GSN=?** or **+GSN?** syntax.

Table 97. +GSN Extended Syntax Commands

Command	Description
+GSN	Displays the product serial number followed by the *OK* result code.
+GSN=?, **+GSN?**	Displays the product serial number followed by the *ERROR* result code.

+IDSR=<value>—Select Data Set Ready Option

Use this command to select how the soft modem manages the DSR signal (V.24 circuit 107).

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> 0, 1.

Table 98. +IDSR Values

Commands	Description
+IDSR=0	DSR is always on.
+IDSR=1	DSR functions as defined in ITU-T recommendation V.24.

Table 99. +IDSR Extended Syntax Commands

Command	Description
+IDSR=<value>	Sets how the modem manages DSR.
+IDSR?	Displays the current parameter value.
+IDSR=?	Displays the available parameter values for the **+IDSR** command.

AT Command Set (continued)

Data and General Commands (continued)

+IFC=<DCE_by_DTE>, <DTE_by_DCE>—DTE-DCE Local Flow Control

Use this command to select the local flow control method. The input parameters of the **+IFC** command overwrite the settings of the **\Q** and **\X<value>** commands. The reverse is also true. By modifying the settings of the **\Q** and **\X<value>** commands, the **+IFC** command parameters are overwritten.

Result codes:

- *OK* if <DCE by DTE> = 0—3 and <DTE by DCE> = 0—2.
- *ERROR* if <DCE by DTE> ≠ 0—3 or <DTE by DCE> ≠ 0—2.

The following combinations are accepted by the modem.

Table 100. +IFC Commands

Command	Data Format
+IFC=0,0	No flow control.
+IFC=1,1	Software flow control.
+IFC=2,2	Hardware flow control (default).
+IFC=3,1	Software flow control with XON/OFF characters passed on to the remote DCE.

Table 101. +IFC Extended Syntax Commands

Command	Description
+IFC=<DCE by DTE>,<DTE by DCE>	Sets the local flow control method.
+IFC?	Displays the current local flow control settings.
+IFC=?	Displays the supported local flow control parameter settings.

+ILRR=<value>—DTE-DCE Local Rate Reporting

Use this command to display or hide the local rate report result code. If the rate report is enabled, the reported <rate> is the current DTE-DCE rate. The rate report is an intermediate result code. It is transmitted after any modulation, error control, or data compression reports, and before the final result code (e.g., *CONNECT*).

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 102. +ILRR Commands

Command	Function
+ILRR=0	Disables the local rate report (default).
+ILRR=1	Enables the local rate report.

AT Command Set (continued)

Data and General Commands (continued)

+ILRR=<value>—DTE-DCE Local Rate Reporting (continued)

Table 103. +ILRR Extended Syntax Commands

Command	Description
+ILRR=<value>	Selects or deselects transmission of the rate report result code.
+ILRR?	Displays the current status of the rate report result code.
+ILRR=?	Displays the supported parameter values for DTE-DCE local rate reporting.

+IPR=<DTE rate>—Fixed DTE Rate

Use this command to set the DTE to DCE transmission rate. There are twelve fixed transmission rates used by the DTE to communicate with the DCE. This commands select one of the predefined transmission rates. If a rate is entered which is not supported, the transmission rate defaults to the next lower rate.

Result codes:

- *OK* for all values of <DTE rate>.

Table 104. +IPR Commands

Command	DTE Rate
+IPR=0	Automatic rate detection (default).
+IPR=300	300 bits/s.
+IPR=1200	1200bits/s.
+IPR=2400	2400 bits/s.
+IPR=4800	4800 bits/s.
+IPR=9600	9600 bits/s.
+IPR=19200	19200 bits/s
+IPR=38400	38400 bits/s.
+IPR=57600	57600 bits/s.
+IPR=115200	115200 bits/s.
+IPR=230400	230400 bits/s.
+IPR=460800	460800 bits/s.
+IPR=921600	921600 bits/s.

Table 105. +IPR Extended Syntax Commands

Command	Description
+IPR=<DTE rate>	Sets the DTE to DCE transmission rate.
+IPR?	Displays the current DTE to DCE transmission rate.
+IPR=?	Displays all supported transmission rates.

AT Command Set (continued)

Data and General Commands (continued)

+MA=<carrier 1>,<carrier 2>, ...—Modulation Automode Control

Use this parameter to define a list of modulations that the soft modem may use to connect with a remote modem for answering or originating automode (automatic modulation negotiation) data calls. The list acts as an extension to the modulation specified by the **+MS=<carrier>** command. The modulation identified by <carrier> in the **+MS** command limits the values in the **+MA** carrier list. Modulations which exceed the rate set by the **+MS** command (see Table 111. Valid <max rate> for each <carrier> for more information), generate an *ERROR* result code and are not implemented by the soft modem. <carrier> values omitted from the list are not available for automode negotiation and are not used in automode negotiation even when the modem is capable of generating the modulation.

Result codes:

- *OK* if <carrier x> = V90, V34, V32T, V32B, V32, V22B, V22, Bell212A, V23C, V21, Bell103 and <carrier x> is less than the carrier set by the **+MS** command.
- *ERROR* if <carrier x> ≠ V90, V34, V32T, V32B, V32, V22B, V22, Bell212A, V23C, V21, Bell103 or <carrier x> is greater than the carrier set by the **+MS** command.

Table 106. +MA Extended Syntax Commands

Command	Description
+MA=<carrier 1>	Defines automode modulation list.
+MA?	Displays the current automode modulation list.
+MA=?	Displays the all available modulations.

+MR=<value>—Modulation Reporting Control

Use this command to enable or disable modulation report result codes. When the modulation report is enabled, the DCE transmits the *+MRR: <rate>, <rx_rate>* and the *+MCR:<carrier>* intermediate result codes to the DTE. The <carrier> reported is the current modulation, for example, V.34. The <rate> reported is the transmit rate in bits per second or is zero if negotiation fails. The <rx_rate> is the receive channel rate and is only reported when different receive and transmit rates have negotiated.

The intermediate result codes are transmitted after the modulation and the rate have been determined and before any error control or data compression reports or the final result code (e.g., *CONNECT*) is transmitted.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 107. +MR Commands

Command	Function
+MR=0	Enables the modulation report (default).
+MR=1	Disables the modulation report.

AT Command Set (continued)

Data and General Commands (continued)

+MR=<value>— Modulation Reporting Control (continued)

Table 108. +MR Extended Syntax Commands

Command	Description
+MR=<value>	Select or deselect transmission of the modulation result codes.
+MR?	Display the current status of the modulation report result code.
+MR=?	Display the supported parameter values for modulation rate reporting.

+MS=<carrier>,<automode>,<min_rate>,<max_rate>—Modulation Selection

Use this command to set the modem's modulation, the modulation's minimum and maximum transmission rate, and the status of automatic modulation negotiation (automode). The <carrier>, <min_rate>, and <max_rate> parameters define the modulation and its minimum and maximum rates.

The <automode> parameter enables or disables automatic modulation negotiation. If a subsequent **+MA** command is not provided, the automode parameters are constrained by the modulation set by the <carrier> parameter. The **+MA** command can further restrict the automatic modulation negotiation settings but it cannot set a modulation that is higher than the modulation set by the **+MS** command.

Result codes:

- *OK* if <automode> = 0, 1 and <min_rate> = 0, 300—57333, and <max_rate> = 0, 300—57333, and carrier is equal to one of the entries in Table 109.
- *ERROR* if <automode> ≠ 0, 1 or <min_rate> ≠ 0, 300—57333, or <max_rate> ≠ 0, 300—57333, or carrier is not equal to one of the entries in Table 109.

Table 109. Valid <carrier> Values

Value	Meaning
V92	V.92 (default)
V90	V.90
V34	V.34
V32T	V.32ter
V32B	V.32 *bis*
V32	V.32
V22B	V.22 *bis*
V.22	V.22
Bell212A	Bell 212A*
V23C	V.23, constant carrier, asymmetric FDM
V21	V21
Bell103	Bell 103*

* The +MS command was standardized by ITU-T recommendation V.250. However, the standard command does not include the additional functionality provided by the Bell212A and Bell103 values of the <carrier> parameter. Refer to ITU-T recommendation V.250 for information regarding the standard command format.

AT Command Set (continued)

Data and General Commands (continued)

+MS=<carrier>,<automode>,<min_rate>,<max_rate>—Modulation Selection (continued)

Automatic modulation negotiation is enabled or disabled by <automode>. However, if a value is specified for the <max_rate>, then automatic rate selection is disabled and the modem will attempt to connect at the specified rate.

Table 110. Valid <automode> Values

Value	Meaning
0	Disables.
1	Enabled (default).

The <max_rate> specifies the highest connections rate for the DCE.

Table 111. Valid <max_rate> Range

Value	Meaning
0	Determined by modulation selected in <carrier> (default).
300—57333	Value limited by modulation selected in <carrier>.

Table 112. Valid <max_rate> for each <carrier>

Value	Meaning
V92	28000 bits/s—57333 bits/s in steps of 1333 bits/s.
V90	28000 bits/s—57333 bits/s in steps of 1333 bits/s.
V34	2400 bits/s—33600 bits/s in steps of 2400 bits/s.
V32bis	4800 bits/s—19200 bits/s in steps of 2400 bits/s.
V32	4800 bits/s—14400 bits/s in steps of 2400 bits/s.
V22bis	2400 bits/s.
V22	2200 bits/s.
V23C, Bell212A	1200 bits/s.
V.21, Bell103	300 bits/s.

Table 113. +MS Extended Syntax Commands

Command	Description
+MS=<carrier>,<automode>, <min_rate>,<max_rate>	Select or deselect transmission of the rate report result code.
+MS?	Display the current status of the rate report result code.
+MS=?	Display the supported parameter values for DTE-DCE local rate reporting.

Once a modulation is selected by the **+MS** command, the autorate in both directions and the automode will be activated unless <max_rate> is specified by the same command.

The settings of this command overwrite the settings of S28, S37, S38, S109. Likewise, changes to these registers overwrite the settings of the **+MS** command.

AT Command Set (continued)

Data and General Commands (continued)

+MSC=<src_v34>—Seamless Rate Change Enable

Use this command to enable or disable V.34 seamless rate changes.

Result codes:

- *OK* if <src_v34> = 0, 1.
- *ERROR* if <src_v34> ≠ 0, 1.

Table 114. +MSC Commands

Command	Function
+MSC=0	Disables V.34 seamless rate change.
+MSC=1	Enables V.34 seamless rate change (default).

Table 115. +MSC Extended Syntax Commands

Command	Description
+MSC=<value>	Enable or disable V.34 seamless rate changes.
+MSC?	Display the current status of the V.34 seamless rate change parameter.
+MSC=?	Display the supported parameter values seamless rate change (0, 1).

+PCW=<call_waiting>—Call Waiting Enable

Use this command to select how the modem responds to a call waiting signal. The soft modems response is also dependent on the current setting of the caller ID command, **+VCID** (see +VCID=<value>—Caller ID on page 55).

Result codes:

- *OK* if <call_waiting> = 0—2.
- *ERROR* if <call_waiting> ≠ 0—2.

Table 116. Valid <call_waiting> Values

Value	Meaning
0	Enable the call waiting detector. When a call waiting signal is detected, toggle V.24 circuit 125 and collect caller ID as set by **+VCID** (default).
1	Enable the call waiting detector. When a call waiting signal is detected, hang up the current call.
2	Disable call waiting detector.

Table 117. +PCW Extended Syntax Commands

Command	Meaning
+PCW=<call_waiting>	Enable or disable call waiting.
+PCW?	Display the current call waiting configuration.
+PCW=?	Display the supported <call_waiting> parameter values.

AT Command Set (continued)

Data and General Commands (continued)

+PIG=<value>—PCM Upstream Ignore

Use this command to enable or disable PCM upstream in a V.92 connection.

Result codes:

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 118. Valid +PIG Commands

Command	Meaning
+PIG=0	Enable PCM upstream.
+PIG=1	Disable PCM upstream (default).

Table 119. +PIG Extended Syntax Commands

Value	Meaning
+PIG=<value>	Enable or disable PCM upstream.
+PIG?	Display the current state of the **+PIG** command.
+PIG=?	Display the supported **+PIG** parameter values.

+PMH=<value>—Modem On Hold Enable

Use this command to enable or disable modem on hold. Note, that the **+PMH** command does not effect the parameters of the **+PMHT** (see +PMHT=<value>—Modem On Hold Timer on page 53) command. The **+PMH** command only enables or disables modem on hold. The **+PMHT** command configures the modem to deny a modem on hold request or grant a modem on hold request with the selected hold time.

Result codes:

- *OK* if <value> = 0, 1
- *ERROR* if <value> ≠ 0, 1

Table 120. Valid +PMH parameter values

Value	Meaning
+PMH=0	Enables modem on hold (default).
+PMH=1	Disables modem on hold.

Table 121. +PMH Extended Syntax Commands

Value	Meaning
+PMH=<value>	Enable or disable modem on hold.
+PMH?	Display the current state of the **+PMH** command.
+PMH=?	Display the supported **+PMH** parameter values.

AT Command Set (continued)

Data and General Commands (continued)

+PMHF—Modem On Hold Hook Flash

Use this command to generate a hook flash during modem on hold operations. The command causes the modem to go on-hook for a period of time set by S29 (see S29—Flash Dial Modifier Duration on page 79). Then the modem returns to the off-hook state for at least 1.5 s.

Result codes:

- *ERROR* if the modem is not on hold when the command is executed.

+PMHR—Initiate Modem On Hold

Use this command to initiate a modem on hold request. Once the local modem receives this request from the user or controlling application, the soft modem requests that the remote modem go on hold. The remote modem either denies the request or grants the request. If the request is granted, the remote modem initialized the modem on hold timer and informs the local modem what the length of the hold duration is. If the request is denied, the local modem generates an *ERROR* result code and hangs up the line.

The **+PMHR** command does not have any extended syntax command forms.

Result codes:

- *OK* if the modem on hold request is granted.
- *ERROR* if the modem on hold request is denied or modem on hold is not enabled.

+PMHT=<value>—Modem On Hold Timer

Use this command to configure the soft modem to grant or reject a modem on hold request. This command configures the modem so it can respond to a modem on hold request. The command must be executed prior to reception of a modem on hold request. If a modem on hold request is made prior to execution of the +PMHT command, by default, the modem on hold request is denied.

This command also sets the modem on hold timer. The modem on hold timer sets the amount of time the modem will remain on hold waiting for the requesting modem to return to the line. If the timer expires, the soft modem will hang up the call.

Result codes:

- *OK* if <value> = 0—13.
- *ERROR* if <value> ≠ 0—13.

Table 122. Valid +PMHT Commands

Command	Meaning
+PMHT=0	Deny modem on hold request (default).
+PMHT=1	Grant modem on hold request with a 10 s time-out.
+PMHT=2	Grant modem on hold request with a 20 s time-out.
+PMHT=3	Grant modem on hold request with a 30 s time-out.
+PMHT=4	Grant modem on hold request with a 40 s time-out.
+PMHT=5	Grant modem on hold request with a 1 min. time-out.
+PMHT=6	Grant modem on hold request with a 2 min. time-out.
+PMHT=7	Grant modem on hold request with a 3 min. time-out.

AT Command Set (continued)

Data and General Commands (continued)

+PMHT=<value>—Modem On Hold Timer (continued)

Table 122. Valid +PMHT Commands (continued)

Command	Meaning
+PMHT=8	Grant modem on hold request with a 4 min. time-out.
+PMHT=9	Grant modem on hold request with a 6 min. time-out.
+PMHT=10	Grant modem on hold request with a 8 min. time-out.
+PMHT=11	Grant modem on hold request with a 12 min. time-out.
+PMHT=12	Grant modem on hold request with a 16 min. time-out.
+PMHT=13	Grant modem on hold request with an indefinite time-out.

Table 123. +PMHT Extended Syntax Commands

Value	Meaning
+PMHT=<value>	Configure the soft modem response to a modem on hold request.
+PMHT?	Display the current modem on hold settings.
+PMHT=?	Display the valid **+PMHT** parameter values.

+PQC=<value>—V.92 Phase 1 and Phase 2 Control

Use this command to configure the V.92 short training sequence. This command selects which short phases are used during initiation of a connection. Once the modem is configured, use the **+PSS** (see +PSS=<value>—Use Short Sequence on page 55) command to enable or disable the short training sequence.

Result codes:

- *OK* if <value> = 0—3.
- *ERROR* if <value> ≠ 0—3.

Table 124. Valid +PQC Commands

Command	Meaning
+PQC=0	Enable short phase 1 and short phase 2 (default).
+PQC=1	Enable short phase 1 only.
+PQC=2	Enable short phase 2 only.
+PQC=3	Disable short phase 1 and short phase 2.

Table 125. +PQC Extended Syntax Commands

Value	Meaning
+PQC=<value>	Configure the soft modem V.92 short training sequence.
+PQC?	Display the current short training sequence settings.
+PQC=?	Display the valid **+PQC** parameter values.

AT Command Set (continued)

Data and General Commands (continued)

+PSS=<value>—Use Short Sequence

Use this command to enable or disable the V.92 short training sequence.

Result codes:

- *OK* if <value> = 0, 2.
- *ERROR* if <value> = 0, 2.

Table 126. Valid +PSS Commands

Command	Meaning
+PSS=0	Use training sequence set in by the **+PQC** command.
+PSS=2	Use long training sequence.

Table 127. +PSS Extended Syntax Commands

Value	Meaning
+PSS=<value>	Select whether the modem determines if the short sequence is used.
+PSS?	Display the current short training sequence settings.
+PSS=?	Display the valid **+PSS** parameter values.

+VCID=<value>—Caller ID

Use this command to enable or disable caller ID.

Result codes:

- *OK* if <value> = 0—2.
- *ERROR* if <value> = 0—2.

Table 128. Valid +VCID Commands

Command	Meaning
+VCID=0	Disable caller ID.
+VCID=1	Enable caller ID with formatted presentation.
+VCID=2	Enable caller ID with out formatting.

Table 129. +VCID Extended Syntax Commands

Value	Meaning
+VCID=<value>	Configure caller ID.
+VCID?	Display current caller ID settings.
+VCID=?	Display all valid **+VCID** parameter values.

AT Command Set (continued)

FAX Commands

The Agere soft modems support FAX commands conforming to *EIA** standard 578 and ITU-T recommendation T.31 (08/95) which outlines class 1 asynchronous facsimile under DCE control.

The nature of FAX communication is for a facsimile machine to transmit a graphic image to a receiving facsimile machine. As a result, most of the commands in this section are not designed for interaction with an end user.

The commands still generate a result code to acknowledge reception and the action taken on a command. However in many cases the command will generate an *ERROR* result code if it is not connected to a sending or receiving facsimile device.

+FAA=<value>—Adaptive Answer

A service class 1 FAX DCE may have the ability to answer as a data modem DCE or as a FAX DCE. It may also be able to change from class 1 FAX mode to data modem operation in response to an incoming call.

Note: This command controls automatic switching from class 1 to class 0 for call answering only. It does not affect call origination, switching to class 1 from other classes, or switching to classes other than class 0.

- *OK* if <value> = 0, 1.
- *ERROR* if <value> ≠ 0, 1.

Table 130. +FAA Commands

Command	Function
+FAA=0	The DCE will answer only as a class 1 FAX device. No automatic switching of service class will occur based on the calling device type (default).
+FAA=1	The DCE can answer and automatically determine whether to answer as a facsimile DCE or as a data modem.

Table 131. +FAA Extended Syntax Commands

Command	Description
+FAA=<value>	Enables or disables adaptive answer.
+FAA?	Display the current setting for adaptive answer.
+FAA=?	Display the available parameter values for the **+FAA** command.

+FCLASS=1—Enter Class 1 FAX Mode

The **+FCLASS=1** command (see +FCLASS=<value>—Service Class Indication on page 42) puts the modem in class 1 FAX mode.

* *EIA* is a registered trademark of Electronics Industries Association.

AT Command Set (continued)

FAX Commands (continued)

+FMI?—Manufacturer Identification

This command returns one of the following results based on the product type:

- Lucent Data/FAX (LU97 based products).
- Agere Systems (SV92P based products)

Result codes:

- This command always yields an *OK* result code.

Table 132. +FMI Extended Syntax

Command	Description
+FMI, **+FMI?**	Displays the modem manufacturer identification.

+FMM?—Product Identification

This command returns the following result:

- Data/FAX.

Result codes:

- This command always yields an *OK* result code.

Table 133. +FMM Extended Syntax

Command	Description
+FMM, **+FMM?**	Displays the modem product identification.

+FMR?—Version/Revision Information

This command returns the modem version code.

Result codes:

- This command always yields an *OK* result code.

Table 134. +FMR Extended Syntax

Command	Description
+FMR, **+FMR?**	Displays the modem product identification.

AT Command Set (continued)

FAX Commands (continued)

+FPR=<value>—Select FAX Port Rate

This command sets the DTE to DCE FAX port rate. The **+FPR** command is supported to assure compatibility with communications software that issues the this command. Soft modem products do not maintain the traditional relationship between the DTE and DCE that this command was designed to control. Soft modem products interface with the host system via a PCI or AC97 interface.

Result codes:

- This command always yields and *OK* result code.

Table 135. +FPR Commands

DTE Command*	Description
+FPR=0	Select automatic rate detection.
+FPR=1	Set DTE-DCE to 2400 bits/s.
+FPR=2	Set DTE-DCE to 4800 bits/s.
+FPR=4	Set DTE-DCE to 9600 bits/s.
+FPR=8	Set DTE-DCE to 19200 bits/s.
+FPR=10	Set DTE-DCE to 38400 bits/s.
+FPR=18	Set DTE-DCE to 57600 bits/s.

* The listed values do not have any significance for soft modem based products. The values listed here are only useful in controller based systems.

Table 136. +FPR Extended Syntax

DTE Command	Description
+FPR=<value>	Does not perform any particular action in soft modem based systems.
+FPR?	Does not perform any particular action in soft modem based systems.

+FRH=<mod>—Receive HDLC Data with <mod> Carrier

Use the **+FRH** command to instruct the modem to receive data framed in the HDLC protocol at the modulation defined by Table 137.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.
- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.
- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

AT Command Set (continued)

FAX Commands (continued)

+FRH=<mod>—Receive HDLC Data with <mod> Carrier (continued)

Table 137. +FRH Commands

Command	Modulation	Speed
+FRH=3	V.21 channel 2.	300 bits/s.
+FRH=24	V.27ter.	2400 bits/s.
+FRH=48	V.27ter.	4800 bits/s.
+FRH=72	V.29.	7200 bits/s.
+FRH=96	V.29.	9600 bits/s.
+FRH=73	V.17.	7200 bits/s.
+FRH=74	V.17 (short train).	7200 bits/s.
+FRH=97	V.17.	9600 bits/s.
+FRH=98	V.17 (short train).	9600 bits/s.
+FRH=121	V.17.	12000 bits/s.
+FRH=122	V.17 (short train).	12000 bits/s.
+FRH=145	V.17.	14400 bits/s.
+FRH=146	V.17 (short train).	14400 bits/s.

Table 138. +FRH Extended Syntax Commands

Command	Description
+FRH=<mod>	Sets the FAX receive rate and frames the data using HDLC protocol.
+FRH=?	Displays all available parameter values for the **+FRH** command.

+FRM=<mod>—Receive Data

Use the **+FRM** command to instruct the modem to received data using the modulation defined by Table 139.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.
- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.
- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

AT Command Set (continued)

FAX Commands (continued)

+FRM=<mod>—Receive Data (continued)

Table 139. +FRM Commands

Command	Modulation	Speed
+FRM=3	V.21 channel 2.	300 bits/s.
+FRM=24	V.27ter.	2400 bits/s.
+FRM=48	V.27ter.	4800 bits/s.
+FRM=72	V.29.	7200 bits/s.
+FRM=96	V.29.	9600 bits/s.
+FRM=73	V.17.	7200 bits/s.
+FRM=74	V.17 (short train).	7200 bits/s.
+FRM=97	V.17.	9600 bits/s.
+FRM=98	V.17 (short train).	9600 bits/s.
+FRM=121	V.17.	12000 bits/s.
+FRM=122	V.17 (short train).	12000 bits/s.
+FRM=145	V.17.	14400 bits/s.
+FRM=146	V.17 (short train).	14400 bits/s.

Table 140. +FRM Extended Syntax Commands

Command	Description
+FRM=<mod>	Sets the FAX receive rate.
+FRM=?	Displays all available parameter values for the **+FRM** command.

+FRS=<value>—Receive Silence

+FRS=<value> causes the modem to listen and wait for <value> x 10 ms of silence to be detected on the line. For example, <value> = 5 results in a 50 ms interval. At the end of this period the modem responds with the *OK* result code. <value> has a range of 0—255.

Result codes:

- *OK* if <value> = 0—255.
- *ERROR* if <value> ≠ 0—255.

AT Command Set (continued)

Data and General Commands (continued)

+FTH=<mod>—Transmit HDLC Data with <mod> Carrier

The **+FTH=<mod>** command causes the modem to transmit data framed in the HDLC protocol at the modulation defined by Table 141.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.
- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.
- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

Table 141. +FTH Commands

Command	Modulation	Speed
+FTH=3	V.21 channel 2.	300 bits/s.
+FTH=24	V.27ter.	2400 bits/s.
+FTH=48	V.27ter.	4800 bits/s.
+FTH=72	V.29.	7200 bits/s.
+FTH=96	V.29.	9600 bits/s.
+FTH=73	V.17.	7200 bits/s.
+FTH=74	V.17 (short train).	7200 bits/s.
+FTH=97	V.17.	9600 bits/s.
+FTH=98	V.17 (short train).	9600 bits/s.
+FTH=121	V.17.	12000 bits/s.
+FTH=122	V.17 (short train).	12000 bits/s.
+FTH=145	V.17.	14400 bits/s.
+FTH=146	V.17 (short train).	14400 bits/s.

Table 142. +FTH Extended Syntax Commands

Command	Description
+FTH=<mod>	Sets the FAX transmit rate and frames the data using HDLC protocol.
+FTH=?	Displays all available parameter values for the **+FTH** command.

AT Command Set (continued)

Data and General Commands (continued)

+FTM=<mod>—Transmit FAX Data with <mod> Carrier

+FTM=<mod> command causes the modem to transmit data using the modulation defined by Table 143.

Result codes:

- *CONNECT* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is an intermediate result code.
- *OK* if <mod> = 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 and the connection is established. This is a final result code.
- *ERROR* if <mod> ≠ 3, 24, 48, 72—74, 96—98, 121, 122, 145, 146 or the connection is not established. This is a final result code.

Table 143. +FTM Commands

Command	Modulation	Speed
+FTM=3	V.21 channel 2.	300 bits/s.
+FTM=24	V.27ter.	2400 bits/s.
+FTM=48	V.27ter.	4800 bits/s.
+FTM=72	V.29.	7200 bits/s.
+FTM=96	V.29.	9600 bits/s.
+FTM=73	V.17.	7200 bits/s.
+FTM=74	V.17 (short train).	7200 bits/s.
+FTM=97	V.17.	9600 bits/s.
+FTM=98	V.17 (short train).	9600 bits/s.
+FTM=121	V.17.	12000 bits/s.
+FTM=122	V.17 (short train).	12000 bits/s.
+FTM=145	V.17.	14400 bits/s.
+FTM=146	V.17 (short train).	14400 bits/s.

Table 144. +FTM Extended Syntax Commands

Command	Description
+FTM=<mod>	Sets FAX transmit rate.
+FTM=?	Displays all available parameter values for the +FTM command.

+FTS=<value>—Transmission Silence

+FTS=<value> causes the modem to terminate a transmission and wait for <value> x 10 ms before responding with the *OK* result code. For example, <value> = 5 results in a 50 ms interval. <value> has a range of 0—255.

Result codes:

- *OK* if <value> = 0—255.
- *ERROR* if <value> ≠ 0—255.

AT Command Set (continued)

Test and Debug AT Command

The following command is used for testing and debugging only. It is not meant for general use.

#UD—Unimodem Diagnostics

This command is defined by *Microsoft* 's* unimodem diagnostics command specification. Agere Systems soft modem products implement a subset of the parameters in that specification.

#UD is an action command. It does not take parameters. It should be the last command in the command line. The modem logs aspects of its operation for each call and saves these results in volatile memory until cleared by one of the following events. These results are not cleared by changing DTR, V.24 circuit 108.2, **&D0**, **&D1**, or **&D2**.

- Power off (or **D1** or **D3** state entered).
- Hard reset (e.g., negate DTR with **&D3** set, reset button).
- Soft reset = **ATZ** or **AT&F**.
- **ATD** or **ATA** command issued.
- Automatic answer (e.g., set register S0 > 0 and ring detected).

In response to this command, the modem reports one or more lines of information text. Information text format is defined in ITU-T recommendation V.253. Each line is both preceded and terminated by a <CR><LF> pair. Note that, as per V.253, CR and LF characters may be changed by writing new values to the contents of registers S2 and S3 respectively.

DIAG <token key = value [[key = value [key = value]] . . . >

where:

DIAG = 5 characters, hexadecimal 44, 49, 41, 47, 20.

'<' = left angle bracket, hexadecimal 3C.

'=' = equal sign, hexadecimal 3D.

'>' = right angle bracket, hexadecimal 3E.

token = unique 32-bit hexadecimal string, i.e., 2A4D3263.

key = one or two digit hexadecimal number. See Table 145.

value = any string.

Unless otherwise noted, all values are hexadecimal numbers. Any numeric values from tables in ITU-T recommendation V.58 are converted to hexadecimal. Multidigit values are reported MSD first. Leading zeros may be deleted.

The following table includes all items listed in *Microsoft's* specification for the **#UD** command. The items that have an X in the Implemented column have been implemented in this release.

Please refer to *Microsoft* 's unimodem diagnostics command specification for more information.

* *Microsoft* is a registered trademark of Microsoft Corporation.

AT Command Set (continued)

Test and Debug AT Command (continued)

Table 145. #UD Last Call Status Report Format

Note: Refer to Table 1 in the *Microsoft* specification.

Key	Value(s)	Required	Definition	Implemented
0	2 digits	Yes	Diagnostic command specification revision number, digit.digit.	X
1	See Table 146	0-A	Call setup result code.	X
2	See Table 3*	0-1	Multimedia mode.	—
3	See Table 4*	0	DTE-DCE interface mode.	—
4	String	Yes	V.8 CM octet string. Same format as V.25ter Annex A, in quotes.	—
5	String	Yes	V.8 JM octet string. Same format as V.25ter Annex A in quotes.	—
6—F	—	—	Reserved for call negotiation reports.	—
10	2 digits	Note 4*	Received signal power level in –dBm (0—43).	X
11	2 digits	Note 4*	Transmit signal power level in –dBm (0—17).	X
12	2 digits	Note 4*	Estimated noise level in –dBm (10—90).	X
13	2 digits	Note 4*	Normalized mean squared error. 100 (0x64) = minimum intersymbol distance.	—
14	2 digits	Note 4*	Near echo loss in dB.	X
15	2 digits	Note 4*	Far echo loss in dB.	X
16	4 digits	Note 4*	Far echo delay in ms.	—
17	—	Note 4*	—	X
18	—	Note 4*	—	—
19—1F	—	—	Reserved for modulation setup and training reports (see note 5*).	—
20	See Table 147	Note 6*	Transmit carrier negotiation result.	X
21	See Table 147	Note 6*	Receive carrier negotiation result.	X
22	4 digits	0—1F40	Transmit carrier symbol rate (0—8000).	X
23	4 digits	0—1F40	Receive carrier symbol rate (0—8000).	X
24	4 digits	0—FA0	Transmit carrier frequency (0—4000).	—
25	4 digits	0—FA0	Receive carrier frequency (0—4000).	—
26	4 digits	0—FA00	Initial transmit carrier data rate (0—64000).	X
27	4 digits	0—FA00	Initial receive carrier data rate (0—64000).	X
28—2F	—	—	Reserved.	—
30	2 digits	0—FF	Temporary carrier loss event count.	—
31	2 digits	0—FF	Carrier rate renegotiation event count.	—
32	2 digits	0—FF	Carrier retrains requested.	X
33	2 digits	0—FF	Carrier retrain requests granted.	X
34	4 digits	0—FA00	Final transmit carrier rate.	X
35	4 digits	0—FA00	Final receive carrier rate.	X

* Refers to notes or tables in the *Microsoft* specification.

AT Command Set (continued)

Test and Debug AT Command (continued)

Table 145. #UD Last Call Status Report Format (continued)

Note: Refer to Table 1 in the *Microsoft* specification.

Key	Value(s)	Required	Definition	Implemented
36—3F	—	—	Reserved.	—
40	See Table 148	0—2	Protocol negotiation result (see note 7*).	X
41	3 digits	0—400	Error control frame size.	—
42	2 digits	0—FF	Error control link time-outs.	X
43	2 digits	0—FF	Error control link NAKs.	—
44	See Table 149	0—1	Compression negotiation result (see note 7*).	X
45	4 digits	0—200	Compression dictionary size (see note 7*).	—
46—4F	—	—	Reserved.	—
50	1 digit	0—2	Transmit flow control: ■ 0 = off. ■ 1 = DC1/DC3. ■ 2 = V.24 ckt 106/133.	—
51	1 digit	0—2	Receive flow control: ■ 0 = off. ■ 1 = DC1/DC3. ■ 2 = V.24 ckt 106/133.	—
52	8 digits	0—FFFFFFFF	Transmit characters sent from DTE (see note 8*).	—
53	8 digits	0—FFFFFFFF	Receive characters sent to DTE (see note 8*).	—
54	8 digits	0—FFFF	Transmit characters lost (data overrun errors from DTE) (see note 9*).	—
55	8 digits	0—FFFF	Receive characters lost (data overrun errors from DTE) (see note 9*).	—
56	8 digits	0—FFFFFFFF	Transmit frame count, if error control protocol running (see note 9*).	X
57	8 digits	0—FFFFFFFF	Receive frame count, if error control protocol running (see note 9*).	X
58	8 digits	0—FFFF	Transmit frame error count, if error control protocol running (see note 9*).	X
59	8 digits	0—FFFF	Receive frame error count, if error control protocol running (see note 9*).	X
5A—5F	—	—	Reserved.	—
60	See Table 150 and Table 151	Note 10*	Termination cause.	X
61	2 digits	0—FF	Call waiting event count.	—
62—7F	—	—	Reserved for future versions of the specification.	—
80—FF	—	—	Reserved for manufacturer proprietary keys.	—

* Refers to notes or tables in the *Microsoft* specification.

AT Command Set (continued)

Test and Debug AT Command (continued)

Table 146. Call Setup Result Codes

Note: Refer to Table 2 in the *Microsoft* specification.

Code	Definition	Implemented
0	No previous call (modem log has been cleared since any previous call).	X
1	No dial tone detected.	X
2	Reorder signal detected. Network busy.	—
3	Busy signal detected.	X
4	No recognized signal detected.	X
5	Voice detected.	—
6	Text telephone signal detected (see V.18).	—
7	Data answering signal detected (e.g. V.25 ANS, V.8ANSam).	X
8	Data calling signal detected (e.g. V.25 CT, V.8 CI).	—
9	FAX answering signal detected (e.g. T.30 CED, DIS).	—
A	FAX calling signal detected (e.g. T.30 CNG).	—
B	V.8 *bis* signal detected.	—
C—F	Reserved.	—

Table 147. gstnModulationSchemeActive from 3.7.2/V.58

Note: Refer to Table 6 in the *Microsoft* specification.

Value (hexadecimal)	Description	Implemented
0	V.17.	—
1	V.21.	—
2	V.22.	—
3	V.22 *bis*.	—
4	V.23 constant carrier (1200/75).	—
5	V.23 switched carrier (half duplex).	—
6	V.26 *bis*.	—
7	V.26 *ter*.	—
8	V.27 *ter*.	—
9	V.29 HD.	—
A	V.32.	X
B	V.32 *bis*.	—
C	V.34.	X
D	V.34 HD.	—
E	V.pcm (asymmetric).	—
F	V.pcm (symmetric).	—
E–7F	Reserved (V.58).	—
80	X2.	—
82	V.FC.	—
83	V.32terbo.	—
80–FF	Reserved for mfgs.	—

AT Command Set (continued)

Test and Debug AT Command (continued)

Table 148. errorControl Active from 3.5.2/V.58

Note: Refer to Table 7 in the *Microsoft* specification.

Value	Description	Implemented
0	Disable/none.	X
1	V.42 LAPM.	X
2	V.42 alternative protocol (*MNP*).	X
3—7F	Reserved (V.58).	—
80	*MNP* Class 10.	—
81	Enhanced cellular protocol.	—
82	*ETC* *.	—
82—FF	Reserved for mfgs.	—

* *ETC* is a registered trademark of Paradyne Corporation.

Table 149. compressionActive from 3.2.2/V.58

Note: Refer to Table 8 in the *Microsoft* specification.

Value	Description	Implemented
0	None.	X
1	V.42 *bis*.	X
2—7F	Reserved (V.58).	—
80	*MNP* Class 5.	X
81—FF	Reserved for manufacturers.	—

Table 150. Additional callCleared Codes (3.6.4/V.58)

Note: Refer to Table 9 in the *Microsoft* specification.

Code	Definition	Implemented
1	No previous call.	X
2	Call is still in progress.	X
3	Call waiting signal detected.	—
4	Delayed (see ETS 300 001).	X

AT Command Set (continued)

Test and Debug AT Command (continued)

Table 151. callCleared Codes from 3.6.4/V.58-1994

Note: callCleared indicates that the DCE has gone on-hook and that the previously existing network connection has been cleared. These values are hexadecimal, converted from decimal in V.58. Refer to Table 10 in the *Microsoft* specification.

Value	Description	Notes	Implemented
0	CauseUnidentified.	Call setup issues.	X
1—3	See Table 150.	—	X
A	NMSinitiatedDialCall.	Network management system.	—
B	NMSinitiatedLeasedLineRestoral.	Network management system.	—
C	NMSinitiatedRedial.	Network management system.	—
D	NMSinitiatedDialDisconnect.	Network management system.	—
14	PowerLoss.	DCE.	—
15	EquipmentFailure.	—	—
16	FrontPanelDisconnectRequested.	—	—
17	FrontPanelLeasedLineRestoral.	—	—
18	AutomaticLeasedLineRestoral.	—	—
19	InactivityTimerExpired.	—	X
1E	cct116RestoralRequest.	DTE interface.	—
1F	cct108isOffInhibitsDial.	—	—
20	cct108turnedOff.	—	—
28	NoNumberProvided.	Line interface.	—
29	BlacklistedNumber.	—	X
2A	CallAttemptsLimitExceeded.	—	X
2B	ExtensionPhoneOffhook.	—	—
2C	CallSetupFailTimerExpired.	—	X
2D	IncomingCallDetected.	—	X
2E	LoopCurrentInterrupted.	—	—
2F	NoDialTone.	—	X
30	VoiceDetected.	—	—
31	ReorderTone.	—	—
32	SitTone.	—	—

AT Command Set (continued)

Test and Debug AT Command (continued)

Table 151. callCleared Codes from 3.6.4/V.58-1994 (continued)

Note: callCleared indicates that the DCE has gone on-hook and that the previously existing network connection has been cleared. These values are hexadecimal, converted from decimal in V.58. Refer to Table 10 in the *Microsoft* specification.

Value	Description	Notes	Implemented
33	EngagedTone.	—	—
34	LongSpaceDisconnect.	—	—
3C	CarrierLost.	Signal converter.	X
3D	TrainingFailed.	—	X
3E	NoModulationinCommon.	—	—
3F	RetrainFailed.	—	X
40	RetrainAttemptCountExceeded.	—	—
41	GstnCleardownReceived.	—	—
42	FAXDetected.	—	—
46	InTestMode.	Test.	—
47	IntrusiveSelfTestInitiated.	—	—
50	AnyKeyAbort.	Call control.	X
51	DteHangupCommand.	—	X
52	DteResetCommand.	—	—
5A	FrameReject.	Error control.	—
5B	NoErrorControlEstablished.	—	X
5C	ProtocolViolation.	—	—
5D	n400exceeded.	—	X
5E	NegotiationFailed.	—	—
5F	DisconnectFrameReceived.	—	—
60	SabmeFrameReceived.	—	—
64	LossOfSynchronization.	Data compression.	—

Result Codes

The soft modem AT command handler responds to commands from the caller and to activity on the line via result codes. Table 152 presents a summary of these result codes.

Two forms of each result code are available. The long-form, or verbose, response is given when **V1** is selected, and the short-form, numeric response is given when **V0** is selected. The long-form code is preceded and terminated by the sequence <CR> <LF>. The short-form is also terminated by <CR>, but it has no preceding sequence. If result codes are suppressed, nothing is returned to the caller.

Table 152. Result Code Summary

Result Code	Numeric Code	Description
OK	0	Acknowledges the execution of a command line.
CONNECT	1	Modem connected to line.
RING	2	Incoming ring signal has been detected.
NO CARRIER	3	Modem lost carrier signal, does not detect carrier signal, or does not detect answer tone.
ERROR	4	Invalid command.
*CONNECT 1200 EC**	5	Connection at 1200 bits/s.
NO DIALTONE	6	No dial tone detected.
BUSY	7	Busy signal detected.
NO ANSWER	8	Remote end never answered.
*CONNECT 2400 EC**	10	Connection at 2400 bits/s.
*CONNECT 4800 EC**	11	Connection at 4800 bits/s.
*CONNECT 9600 EC**	12	Connection at 9600 bits/s.
*CONNECT 14400 EC**	13	Connection at 14400 bits/s.
*CONNECT 19200 EC**	14	Connection at 19200 bits/s.
*CONNECT 7200 EC**	24	Connection at 7200 bits/s.
*CONNECT 12000 EC**	25	Connection at 12000 bits/s.
*CONNECT 16800 EC**	86	Connection at 16800bits/s.
*CONNECT 300 EC**	40	Connection at 300 bits/s.
*CONNECT 21600 EC**	55	Connection at 21600 bits/s.
*CONNECT 24000 EC**	56	Connection at 24000 bits/s.
*CONNECT 26400 EC**	57	Connection at 26400 bits/s.
*CONNECT 28800 EC**	58	Connection at 28800 bits/s.
*CONNECT 31200 EC**	59	Connection at 31200 bits/s.
*CONNECT 33600 EC**	60	Connection at 33600 bits/s.
*CONNECT 38400 EC**	28	Connection at 38400 bits/s (DTE rate).
*CONNECT 57600 EC**	18	Connection at 57600 bits/s (DTE rate).
*CONNECT 115200 EC**	87	Connection at 115200 bits/s (DTE rate).

* EC only appears when the extended result codes configuration option is enabled. EC is replaced by one of the following symbols, depending on the error control method used:

V42bis—V.42 error control and V.42 *bis* data compression.
V42—V.42 error control only.
MNP 5—*MNP* class 4 error control and *MNP* class 5 data compression.
MNP 4—*MNP* class 4 error control only.
NoEC—no error control protocol.

Result Codes (continued)

Table 152. Result Code Summary (continued)

Result Code	Numeric Code	Description
DELAYED	88	Delay is in effect for the dialed number.
BLACKLISTED	89	Dialed number is blacklisted.
BLACKLIST FULL	90	Blacklist is full.
*CONNECT 32000 EC**	70	Connection at 32000 bits/s.
*CONNECT 34000 EC**	71	Connection at 34000 bits/s.
*CONNECT 36000 EC**	72	Connection at 36000 bits/s.
*CONNECT 38000 EC**	73	Connection at 38000 bits/s.
*CONNECT 40000 EC**	74	Connection at 40000 bits/s.
*CONNECT 42000 EC**	75	Connection at 42000 bits/s.
*CONNECT 44000 EC**	76	Connection at 44000 bits/s.
*CONNECT 46000 EC**	77	Connection at 46000 bits/s.
*CONNECT 48000 EC**	78	Connection at 48000 bits/s.
*CONNECT 50000 EC**	79	Connection at 50000 bits/s.
*CONNECT 52000 EC**	80	Connection at 52000 bits/s.
*CONNECT 54000 EC**	81	Connection at 54000 bits/s.
*CONNECT 56000 EC**	82	Connection at 56000 bits/s.
*CONNECT 28000 EC**	100	Connection at 28000 bits/s.
*CONNECT 29333 EC**	101	Connection at 29333 bits/s.
*CONNECT 30666 EC**	102	Connection at 30666 bits/s.
*CONNECT 33333 EC**	103	Connection at 33333 bits/s.
*CONNECT 34666 EC**	104	Connection at 34666 bits/s.
*CONNECT 37333 EC**	105	Connection at 37333 bits/s.
*CONNECT 38666 EC**	106	Connection at 38666 bits/s.
*CONNECT 41333 EC**	107	Connection at 41333 bits/s.
*CONNECT 42666 EC**	108	Connection at 42666 bits/s.
*CONNECT 45333 EC**	109	Connection at 45333 bits/s.
*CONNECT 46666 EC**	110	Connection at 46666 bits/s.
*CONNECT 49333 EC**	111	Connection at 49333 bits/s.
*CONNECT 50666 EC**	112	Connection at 50666 bits/s.
*CONNECT 53333 EC**	113	Connection at 53333 bits/s.
*CONNECT 54666 EC**	114	Connection at 54666 bits/s.

* EC only appears when the extended result codes configuration option is enabled. EC is replaced by one of the following symbols, depending on the error control method used:
V42bis—V.42 error control and V.42 *bis* data compression.
V42—V.42 error control only.
MNP 5—*MNP* class 4 error control and *MNP* class 5 data compression.
MNP 4—*MNP* class 4 error control only.
NoEC—no error control protocol.

S-Registers

The current setting of each S-register may be displayed by the **S<register number>?** command. There are two forms for this command.

Table 153. S<register number> Extended Syntax

Syntax	Function
S<register_number>?	Displays register contents.
S<register_number>=<value>*	Sets the contents of the register to <value>.

***** Some registers are read only and are not affected by the **S<register number>=<value>** command.

Table 154. S-Register Summary

Register	Description	Range	Base Unit	Default*
S0	Auto answer ring number.	0—255	Rings	0†
S1	Ring counter.	0—255	Rings	0
S2	AT escape character (user defined).	0—255	ASCII	43(2Bh)
S3	Carriage return character.	0—127	ASCII	13(0Dh)
S4	Line feed character.	0—127	ASCII	10(0Ah)
S5	Back space character.	0—255	ASCII	8(08h)
S6	Time for dial tone.	3—255	s	3†
S7	Wait time for carrier.	1—255	s	50†
S8	Pause time for dial delay modifier.	0—255	s	2†
S9	Reserved.	—	—	—
S10	Reserved.	—	—	—
S11	DTMF tone duration.	50—255	ms	95†
S12	Escape guard time.	0—255	20 ms	50
S14	General bit-mapped options status: command echo, quiet mode, result codes, tone/pulse.	—	—	138(10001010b)
S20	Sync underrun fill character.	0—255	—	0
S21	V.24/general bit-mapped options status: DTR behavior, DCD behavior.	—	—	48(00110000b)
S22	Speaker/results bit-mapped options status: speaker volume, speaker control, limit result codes, pulse dial make/break ratio.	—	—	70(01000110b)
S23	General bit-mapped options status: guard tone type, busy cycles, bell mode permitted flag, ABCD dialing permitted.	—	—	54(00110101b)
S27	General bit-mapped options status: V.90 upstream at 3429 Hz, remote digital loop-back request handling, bell compatibility mode, maximum DCE speed.	—	—	73(01001001b)
S28	General bit-mapped options status: pulse dialing, mode selection.	—	—	160(10100000b)
S29	Flash dial modifier time.	0—255	10 ms	50
S30	Inactivity timer.	0—255	10 min.	0
S35	Reserved.	—	—	—

* Values presented in decimal except were noted.
† Values are country-specific.

S-Registers (continued)

Table 154. S-Register Definitions (continued)

Register	Description	Range	Base Unit	Default*
S36	LAPM failure control.	—	—	7
S37	Line connection speed.	—	—	0
S42	Reserved.	—	—	—
S43	Reserved.	—	—	—
S48	V.42 negotiation control.	—	—	7
S53	General bit-mapped options: calling tone flag, off-hook restrictions, blind dial pause, dial modifier validation, pulse and dial tone in same dial string.	—	—	47
S54	Blind dialing delay.	2—255	—	2
S56	General bit-mapped options.	—	—	0
S90	Reserved.	—	—	—
S91	PSTN transmit attenuation level.	6—25	–dB	10
S92	FAX transmit attenuation level.	6—25	dB	10
S93	DTMF transmit attenuation level.	5—25	dB	6
S94	DTMF transmit attenuation level for high DTMF group.	0—25	dB	0

* Values presented in decimal except were noted.
† Values are country-specific.

S-Register Definitions

S0—Auto-Answer Ring Number

This register determines the number of rings the modem will count before automatically answering a call. The user can disable autoanswer by entering zero. When autoanswer is disabled, modem can answer only with the A command.

- Range: 0—255.
- Default: 0.
- Base Unit: 1 ring.

S1—Ring Counter

S1 is incremented each time the soft modem detects a ring signal on the telephone line. S1 is cleared if no rings occur over a six second interval. This register is read-only.

- Range: 0—255.
- Default: 0.
- Base Unit: 1 ring.

S-Registers (continued)

S-Register Definitions (continued)

S2—AT Escape Character (User-Defined)

S2 holds the decimal value of the ASCII character used as the escape character. The default value corresponds to an ASCII +. The escape sequence allows the modem to exit data mode and enter command mode when on-line. A value over 127 disables the escape process, i.e., no escape character will be recognized.

- Range: 0—255.
- Default: 43 (+).
- Base Unit: ASCII.

S3—Carriage Return Character (User-Defined)

S3 sets the character used to terminate command line and result codes.

Note: This register value is not stored with the &W command.

- Range: 0—127.
- Default: 13 (carriage return).
- Base Unit: ASCII.

S4—Line Feed Character (User-Defined)

Use this register to set the ASCII value used as the line feed character. Soft modem products use a line feed character in command mode when it responding to the computer.

Note: This register value is not stored with the &W command.

- Range: 0—127.
- Default: 10 (line feed).
- Base Unit: ASCII.

S5—Back Space Character (User-Defined)

S5 sets the character recognized as a backspace. (Pertains to asynchronous operation only.) The modem will not recognize the backspace character if it is set to a value that is greater than 32 ASCII. This character can be used to edit a command line. When the echo command is enabled, the soft modem echoes back to the local DTE the backspace character, an ASCII space character, and a second backspace character. Therefore, a total of three characters are transmitted each time the modem processes a backspace character.

Note: This register value is not stored with the **&W** command.

- Range: 0—255.
- Default: 8 (Backspace).
- Base Unit: ASCII.

S-Registers (continued)

S-Register Definitions (continued)

S6—Time For Dial Tone

Use this register to set the length of time in seconds between the soft modem's off-hook event and dialing the first digit of the number. Soft modem based products always pause for a minimum of three seconds, even if the value of S6 is less than three seconds. The wait for dial tone progress feature (W dial modifier in the dial string) will override the value in register S6. This operation, however, may be affected by some **X<value>** command options according to country restrictions.

If bit seven of S53 is not set, this command sets the length of time (in seconds) that the soft modem will wait for a dial tone before starting blind dialing.

- Range: 3—255.
- Default: 3.
- Base Unit: 1 s.

S7—Wait Time For Carrier

S7 sets the length of time (in seconds) that the modem will wait for a carrier before hanging up. The timer starts when the soft modem finishes dialing (originate) or two seconds after going off-hook (answer). In originate mode, the timer is reset upon detection of an answer tone if allowed by country restrictions. The timer also specifies the wait for silence time for the @ dial modifier in seconds. S7 is not associated with the W dial modifier.

- Range: 1—255.
- Default: 50.
- Unit: 1 s.

S8—Pause Time For Dial Delay Modifier

S8 sets the time, in seconds, that the soft modem will pause when a dial delay modifier(,) is encountered in the dial string.

- Range: 0—255.
- Default: 2.
- Base Unit: 1 s.

S11—DTMF Tone Duration

This register determines the dialing speed which is prefixed for each country. For countries where change of the DTMF is not allowed the value of S11 is set to 0. The value in S11 has no effect on pulse dialing.

- Range: 50—255.
- Default: 95.
- Base Unit: 1 ms.

S-Registers (continued)

S-Register Definitions (continued)

S12—Escape Guard Time

This register sets the value in 0.02 s increments for the required pause after the escape sequence.

- Range: 0—255.
- Default: 50.
- Base Unit: 0.02 s.

S14—General Bit-Mapped Options Status

S14 indicates the status of command options. Only bits 1, 2, 3, and 5 are used; they are read-only.

- Default: 138 (8Ah) (10001010b).

Table 155. Register S14 Bits

Bit	Description	Value
0	Line current monitoring.	0 = disable (default). 1 = enabled.
1	Command echo (**E<value>**).	0 = disabled (**E0**). 1 = enabled (**E1**) (default).
2	Quiet mode (**Q<value>**).	0 = send result codes (**Q0**) (default). 1 = do not send result codes (**Q1**).
3	Result codes (**V<value>**).	0 = numeric (**V0**). 1 = verbose (**V1**) (default).
5	Tone (**T**)/pulse (**P**).	0 = tone (**T**) (default). 1 = pulse (**P**).
6	Pulse dial PPS selection (**&P<value>**).	0 = 10 PPS (**&P0**, **&P1**) (default). 1 = 20 PPS (**&P2**).

S20—Sync Mode Underrun Fill Character

Specifies the character that will be sent in sync mode when there is not enough valid data available.

- Range: 0 to 255.
- Default: 0.

S21—V.24/General Bit-Mapped Options Status

S21 indicates the status of command options. Only bits 3, 4, and 5 are used; they are read-only.

- Default: 48 (30h) (00110000b).

S-Registers (continued)

S-Register Definitions (continued)

S21—V.24/General Bit-Mapped Options Status (continued)

Table 156. Register S21 Bits

Bit	Description	Value
0	Set by **&J<value>** command but otherwise ignored.	0 = **J0** (default). 1 = **J1**.
1	Sync mode underrun action.	0 = Send underrun fill character (20) (default). 1 = Repeat last valid character.
3—4	DTR behavior (**&D<dial string>**).	0 = **&D0** selected. 1 = **&D1** selected. 2 = **&D2** selected (default). 3 = **&D3** selected.
5	DCD behavior (**&C<value>**).	0 = **&C0** selected. 1 = **&C1** selected (default).
6	DSR behavior (**&S<value>**).	0 = **&S0** selected (default). 1 = **&S1** selected.
7	Long space disconnect (**Y<value>**).	0 = **Y0** (default). 1 = **Y1**.

S22—Results Bit-Mapped Options Status

S22 indicates the status of command options. Only bit 7 is reserved.

- Default: 70 (46h) (01000110b).

Table 157. Register S22 Bits

Bit	Description	Value
0—1	Speaker volume.	0 = off (**L0**). 1 = low (**L1**). 2 = medium (**L2**) (default). 3 = high (**L3**).
2—3	Speaker control (**M<value>**).	0 = disabled (**M0**). 1 = off on carrier (**M1**) (default). 2 = always on (**M2**). 3 = on during handshake (**M3**).
4—6	Limit result codes (**X<value>**).	0 = **X0**. 1 = **X1**. 2 = **X2**. 3 = **X3**. 4 = **X4** (default). 5 = **X5**.
7	Pulse dial make/break ration (**&P<value>**).	0 = 33/67 make/break ratio (**&P1**, **&P2**) (default). 1 = 39/61 make/break ratio (**&P0**).

S-Registers (continued)

S-Register Definitions (continued)

S23—General Bit Mapped Options Status

Indicates the status of command options.

- Default: 8 (8h) (00110110b).

Table 158. Register S23 Bits

Bit	Description	Value	Effect
0	Bell mode switching by **ATB<value>**.	0	Enabled (default)
		1	Disabled
1—3	Number of busy signals to detect line condition.	3	—
4	ABCD DTMF dialing.	0	Enabled (default)
		1	Disabled
5	Busy detection during dial tone detection.	0	Enabled (default)
		1	Disabled
6—7	Guard tone (**&G<guard tone>**).	0	None (**&G0**) (default)
		1	550 Hz (**&G1**)
		2	1800 Hz (**&G2**)

S27—General Bit Mapped Options Status

- Default: 73 (49h) (01001001b).

Table 159. Register S27 Bits

Bit	Description	Value
0	V.90 upstream at 3429 Hz.	0 = disabled. 1 = enabled (default).
1	Remote digital loopback request handling.	0 = deny (default). 1 = grant.
2—5	Reserved.	—
6	Bell compatibility mode.	0 = ITU-T(CCITT) mode. 1 = bell mode (default).
7	Maximum DCE speed.	0 = not limited (default). 1 = limited to DTE rate.

S-Registers (continued)

S-Register Definitions (continued)

S28—General Bit-Mapped Options Status

- Default: 160 (A0h) (10100000b).

Table 160. Register S28 Bits

Bit	Description	Value
3—4	Pulse dialing (**&P**<value>).	0 = 39%—61% make/break ratio at 10 pulses/s (**&P0**) (default). 1 = 33%—67% make/break ratio at 10 pulses/s (**&P1**). 2 = 39%—61% make/break ratio at 20 pulses/s (**&P2**). 3 = 33%—67% make/break ratio at 20 pulses/s (**&P3**).
5—7	Mode selection (**&Q**<value>).	See Table 161. **&Q0**—Selects asynchronous normal buffered mode. **&Q1**—Selects synchronous connect mode with asynchronous command mode. **&Q2**—Returns *ERROR*. **&Q3**—Returns *ERROR*. **&Q4**—Returns *ERROR*. **&Q5**—The soft modem will attempt to establish an error-corrected link. Register S36 determines the type of the like and the fallback options. **Note**: For performance reasons, an error-corrected link is not supported in V.23 (1200/75 bits/s) and all 300 bits/s modes. **&Q6**—Selects asynchronous normal buffered mode.

Table 161. Register 28, Bits 5—7

Bit 7	Bit 6	Bit 5	Description
0	0	0	Selects asynchronous normal buffered mode.
0	0	1	Selects synchronous connect mode with asynchronous command mode.
0	1	0	Reserved.
0	1	1	Reserved.
1	0	0	Reserved.
1	0	1	The soft modem attempts an error-corrected link. Register S36 determines the type of link and the fallback options (default).
1	1	0	Selects asynchronous normal buffered mode (**&Q6**).
1	1	1	Reserved.

S29—Flash Dial Modifier Duration

Set the duration of the hook flash (!).

- Range: 0—255.
- Default: 50.
- Base Unit: 10 milliseconds.

S-Registers (continued)

S-Register Definitions (continued)

S30—Inactivity Timer

This register specifies the length of time in minutes that the modem will wait before disconnecting when no data is sent or received. This function is only applicable to buffer mode.

- Range: 0—255.
- Default: 0 (disabled).
- Base Unit: 10 min.

S36—LAPM Failure Control

- Default: 7 (00000111b).

Bit	Description	Value
0—2	Action upon LAPM failure. If S48 = 128, the fallback options are initiated immediately after establishing the data connection. If an invalid number is entered, the number is accepted into the register, but S36 will act as if the default value has been entered. **Note:** For performance reasons, an error-corrected link is not supported in V.23 (1200/75 bits/s) or any 300 bits/s mode.	0 = The soft modem disconnects. 1 = The soft modem stays on-line and a normal mode connection is established. 2 = Reserved. 3 = The soft modem stays on-line and a normal mode connection is established. 4 = A MNP connection is attempted and if it fails, the soft modem disconnects. 5 = A MNP connection is attempted and if it fails, a normal mode connection is established. 6 = Reserved. 7 = A MNP connection is attempted and if it fails, a normal mode connection is established (default).
4—7	Reserved.	—

S-Registers (continued)

S-Register Definitions (continued)

S37—Dial Line Rate

This register sets the maximum line data rate. In V.90 mode, S37 controls the upstream V.34 rate.

- Range: 0—19.
- Default: 0.

* The register default shown here is for North America.

Table 162. Register S37 Values

Value	Rate	Value	Rate
0	Auto rate (default).	10	12000 bits/s.
1	Reserved.	11	14400 bits/s.
2	1200/75 bits/s (V.23).	12	16800 bits/s.
3	300 bits/s.	13	19200 bits/s.
4	Reserved.	14	21600 bits/s.
5	1200 bits/s.	15	24000 bits/s.
6	2400 bits/s.	16	26400 bits/s.
7	4800 bits/s.	17	28800 bits/s.
8	7200 bits/s.	18	31200 bits/s.
9	9600 bits/s.	19	33600 bits/s.

S48—LAPM Error Control and Feature Negotiation

This register is used in conjunction with register S36 to define LAPM error control and feature negotiation. If an invalid number is entered, the register accepts the value but S48 uses the 128 setting.

- Range: 0, 7, or 128.
- Default: 7.

Table 163. Register S48

Value	Description
S48 = 7	Enable negotiation (default).
S48 = 128	Disable negotiation. Forces immediate fallback options specified in S36.
S48 = 0	Disable negotiation. Bypass the detection and negotiation phases then proceed with LAPM.

The following table lists the S36 and S48 configuration settings necessary to negotiate certain types of connections.

Table 164. Register S36 and S48 Configuration Settings

Register S36 Settings	S48 = 7	S48 = 128
S36 = 0, 2	LAPM or hang-up.	Do not use.
S36 = 1, 3	LAPM or asynchronous.	Asynchronous.
S36 = 4, 6	LAPM, *MNP*, or hang-up.	*MNP* or hang-up.
S36 = 5, 7	LAPM, *MNP*, or asynchronous.	*MNP* or asynchronous.

S-Registers (continued)

S-Register Definitions (continued)

S53—General Bit Mapped Options

- Default: 47 (2Fh) (00101111b).

Table 165. Register S53 Bits

Bit	Description	Value	Effect
0	Tone dialing.	0	Disabled
		1	Enabled
1	Pulse dialing.	0	Disabled
		1	Enabled
2	Switch between tone and pulse dialing in a single dialing string (if both tone and pulse dialing are enabled).	0	Disabled
		1	Enabled
3	20 pps pulse dialing.	0	Disabled
		1	Enabled
4	1300 Hz calling tone.	0	Disabled
		1	Enabled
5	ATH1 feature.	0	Disabled
		1	Enabled
6	Speaker monitoring.	0	Not enforced
		1	Enforced
7	Blind dialing control.	0	Blind dialing delay in S6
		1	Blind dialing delay in S54

S54—Blind Dialing Delay

When bit 7 of S53 is set this register controls the length of time (in seconds) that the modem will wait before starting to dial after going off-hook when blind dialing. This register is used for the countries where the wait for dial tone delay (S6) can be set differently from blind dialing delay.

S-Registers (continued)

S-Register Definitions (continued)

S56—General Bit Mapped Options

- Default: 0 (00h) (00000000b).

Table 166. Register S56 Bits

Bit	Description	Value	Effect
0—1	Pulse dialing method	0	N pulses per digits (0 -> 10 pulses).
		1	N+1 pulses per digit.
		2	10-N pulses per digit.
		3	Reserved.
2—3	Dial modifier translation	0	"," pause dial modifier, "W" wait for dial tone.
		1	Both "," and "W" translated into pause dial modifier.
		2	Both "," and "W" translated into wait for dial tone modifier.
4	Hook flash during pulse dialing	0	Disabled.
		1	Enabled.
5	Secondary dial tone detection	0	Disabled.
		1	Enabled.
6	Phone connect 52000 response for all V.90 data rates	0	Disabled.
		1	Enabled.
7	V.90 rate derision for poor quality connections	0	Conservative.
		1	Aggressive.

S91—Data Transmit Level

Register S91 specifies the line transmit level in dBm with an implied minus sign.

- Range: 6—25 (corresponding to –6 dBm to –25 dBm transmit level).
- Default: 10 (–10 dBm transmit level).
- Base Units: –dBm transmit level.

S92—FAX Transmit Level

Sets the transmit attenuation level from 6 to 25 dBm for the FAX mode, resulting in a transmit level from –6 to –25 dBm.

- Range: 6 to 25 dBm (corresponding to –6 to –25 dBm transmit level).
- Default: 10 (–10 dBm transmit level).
- Base Unit: –1 dBm transmit level.

S-Registers (continued)

S-Register Definitions (continued)

S93—DTMF Transmit Level

This register has a dual purpose:

1. When S94 is set to zero, this register controls the overall DTMF transmit level, with the twist between DTMF groups fixed at 2 dB.
2. When S94 is set to a nonzero value, this register controls the transmit level for low DTMF group only.

- Range: 5 to 25 dBm (corresponding to –5 to –25 dBm transmit level).
- Default: 6 (–6 dBm transmit level).
- Base Unit: –1 dBm transmit level.

S94—DTMF Transmit Level for High DTMF Group

This register has a dual purpose:

1. When S94 is zero, then S93 controls the overall DTMF transmit level, with the twist between DTMF groups fixed at 2 dB.
2. When S94 is set to nonzero value it controls the transmit level for high DTMF group only.

- Range: 0, 5 to 25 dBm (corresponding to –5 to –25 dBm transmit level).
- Default: 0 (S93 controls overall DTMF transmit gain).
- Base Unit: –1 dBm.

AT Command Cross Reference Tables

Table 167. Data and General Commands

Command	Description	Reference*
A/	Repeat last command.	—
A	Answer.	V.250 (05/99)
B	Communication standard setting.	—
C	Carrier control.	—
D	Dial.	V.250 (05/99)
E	Echo command.	V.250 (05/99)
F	On-line data character echo command.	—
H	Hook control.	V.250 (05/99)
I	Request ID information.	V.250 (05/99)
L	Speaker volume.	V.250 (05/99)
M	Speaker control.	V.250 (05/99)
N	Modulation handshake.	—
O	Return to on-line data mode.	V.250 (05/99)
P	Select pulse dialing.	V.250 (05/99)
Q	Result code control.	V.250 (05/99)
S	S register control.	V.250 (05/99)
T	Select tone dialing.	V.250 (05/99)
V	DCE response format.	V.250 (05/99)
W	Result code option.	—
X	Extended result code control.	V.250 (05/99)
Y	Long-space disconnect.	—
Z	Reset and recall stored profile.	V.250 (05/99)
&B	V.32 auto retrain.	—
&C	Data carrier detect (DCD) control.	V.250 (05/99)
&D	Data terminal ready (DTR) control.	V.250 (05/99)
&F	Restore factory default configuration.	V.250 (05/99)
&G	V.22 *bis* guard tone control.	—
&J	Auxiliary relay options.	—
&K	Local flow control selection.	—
&M	Asynchronous communications mode.	—
&P	Pulse dial make-to-break ratio selection.	—
&Q	Asynchronous communications mode.	—
&S	Data set ready (DSR) option.	—
&T	Self-test commands.	—
&V	Display active configuration.	—
&W	Store current configuration.	—
&Y	Select stored profile for hard reset.	—
&Z	Store telephone number.	—
\A	Select maximum *MNP* block size.	—
\B	Send break.	—
\G	Modem port flow control.	—
\J	Adjust bits/s rate control.	—

* All references are ITU-T recommendations unless otherwise noted.

AT Command Cross Reference Tables (continued)

Table 167. Data and General Commands (continued)

Command	Description	Reference*
\J	Adjust bits/s rate control.	—
\K	Set break control.	—
\N	Select error control mode.	—
\Q	Local flow control selection.	—
\R	Ring indicator off after answer.	—
\T	Inactivity timer.	—
\V	Protocol result code.	—
%B	View numbers in blacklist.	—
%C	Data compression control.	—
%E	Auto fallback/fallforward control.	—
-C	Data calling tone.	—
-V90	Enable/disable V.90 settings.	—
#UD	Unimodem diagnostics.	—
+A8E	V.8 and V.8 *bis* operation control.	—
+A8T	Send V.8 *bis* signal and/or message.	—
+AST0	Store telephone number.	V.250 (05/99)
+DR	Data compression reporting.	V.250 (05/99)
+DS	Data compression.	V.250 (05/99)
+EB	Brake handling in error control operations.	V.250 (05/99)
+EFRAM	Frame length.	V.250 (05/99)
+ER	Error control reporting.	—
+ES	Error control selection.	V.250 (05/99)
+ESR	Selective repeat.	V.250 (05/99)
+ETBM	Call termination buffer management.	V.250 (05/99)
+FCLASS	Service class indicator.	V.253 (02/98)
+GCI	Country of installation.	V.250 (05/99)
+GMI	Manufacturer identification.	V.250 (05/99)
+GMM	Modem identification.	V.250 (05/99)
+GMR	Request revision information.	V.250 (05/99)
+GOI	Request global object identification	V.250 (05/99)
+GSN	Request product serial number identification	V.250 (05/99)
+IDSR	Select data set ready options	V.250 (05/99)
+IFC	DTE-DCE local flow control.	V.250 (05/99)
+ILRR	DTE-DCE local rate reporting.	V.250 (05/99)
+ILSD	Select long space disconnect options	V.250 (05/99)
+IPR	Fixed DTE rate.	V.250 (05/99)
+ITF	Transmit flow control threshold	—
+MA	Modulation automode control	V.250 (05/99)
+MR	Modulation reporting control	V.250 (05/99)
+MS	Modulation selection	V.250 (05/99)
+MSC	Seamless rate change enable	V.250 (05/99)

* All references are ITU-T recommendations unless otherwise noted.

AT Command Cross Reference Tables (continued)

Table 168. FAX Class 1 Commands Summary

Command	Function	Reference*
+FAA	Set DCE adaptive answer mode.	—
+FCLASS	Service class indicator.	T.31 (08/95)
+FMI	Manufacturer identification.	T.31 (08/95)
+FMM	Product identification.	T.31 (08/95)
+FMR	Version/revision information.	T.31 (08/95)
+FPR	Set DTE-DCE FAX port rate.	T.31 (08/95)
+FRH	Receive HDLC data with n carrier.	T.31 (08/95)
+FRM	Receive FAX data with n carrier.	T.31 (08/95)
+FRS	Receive silence.	T.31 (08/95)
+FTH	Transmit HDLC data with n carrier.	T.31 (08/95)
+FTM	Transmit FAX data with n carrier.	T.31 (08/95)
+FTS	Transmission silence.	T.31 (08/95)

* All references are ITU-T recommendations unless otherwise noted.

Table 169. V.92 and V.44 Commands

Command	Function	Reference
+DS44	V.44 data compression	V.250
+PCW	Call waiting enable	V.250
+PIG	PCM upstream ignore	V.250
+PMH	Modem on hold enable	V.250
+PMHF	V.92 modem on hold flash hook	V.250
+PMHR	Initiate modem on hold	V.250
+PMHT	Modem on hold timer	V.250
+PQC	V.92 phase 1 and phase 2 control	V.250
+PSS	Use short sequence	V.250

AT Command Cross Reference Tables (continued)

Table 170. T.35 Country Code Table

TAPI Code (decimal)	Country	AT+GCI Code T.35 (hex)	AT%T19 code
0	Europe	0xFB	0x2A
54	Argentina	0x07	0x33
61	Australia	0x09	0x01
43	Austria	0x0A	0x0F
880	Bangladesh	0x0D	0x4C
104	Barbados	0x0E	0x46
375	Belarus	none	0x4E
32	Belgium	0x0F	0x02
591	Bolivia	0x14	0x34
55	Brazil	0x16	0x2B
359	Bulgaria	0x1B	0x2C
107	Canada	0x20	0x1C
56	Chile	0x25	0x35
57	Colombia	0x27	0x36
506	Costa Rica	0x2B	0x40
385	Croatia	none	0x4F
357	Cyprus	0x2D	0x2D
420	Czech Republic	0x2E	0x28
45	Denmark	0x31	0x03
593	Ecuador	0x35	0x37
20	Egypt	0x36	0x45
372	Estonia	0xFA	0x51
358	Finland	0x3C	0x04
33	France	0x3D	0x05
49	Germany	0x04	0x06
30	Greece	0x46	0x21
124	Guam	0x48	0x47
502	Guatemala	0x49	0x3F
852	Hong Kong	0x50	0x1B
36	Hungary	0x51	0x22
354	Iceland	0x52	0x2E
91	India	0x53	0x1E
62	Indonesia	0x54	0x17
353	Ireland	0x57	0x1A
972	Israel	0x58	0x30
39	Italy	0x59	0x08
81	Japan	0x00	0x10
82	Korea	0x61	0x12
965	Kuwait	0x62	0x48
371	Latvia	0xF8	0x52
961	Lebanon	0x64	0x4D
423	Liechtenstein	0x68	0x42

AT Command Cross Reference Tables (continued)

Table 170. T.35 Country Code Table (continued)

TAPI Code (decimal)	Country	AT+GCI Code T.35 (hex)	AT%T19 code
370	Lithuania	0xF9	0x50
352	Luxembourg	0x69	0x29
60	Malaysia	0x6C	0x13
356	Malta	0x70	0x53
52	Mexico	0x73	0x1D
212	Morocco	0x77	0x54
31	Netherlands	0x7B	0x07
64	New Zealand	0x7E	0x09
505	Nicaragua	0x7F	0x41
47	Norway	0x82	0x0A
968	Oman	0x83	0x4B
92	Pakistan	0x84	0x32
507	Panama	0x85	0x38
595	Paraguay	0x87	0x3B
86	People's Republic of China	0x26	0x11
51	Peru	0x88	0x39
63	Philippines	0x89	0x20
48	Poland	0x8A	0x25
351	Portugal	0x8B	0x18
121	Puerto Rico	0x8C	0x3D
40	Romania	0x8E	0x49
7	Russia	none	0x2F
966	Saudi Arabia	0x98	0x31
65	Singapore	0x9C	0x14
389	Slovakia	0xFC	0x27
386	Slovenia	0xFD	0x26
27	South Africa	0x9F	0x24
34	Spain	0xA0	0x0B
94	Sri Lanka	0xA1	0x4A
46	Sweden	0xA5	0x0C
41	Switzerland	0xA6	0x0D
886	Taiwan	0xFE	0x15
66	Thailand	0xA9	0x16
90	Turkey	0xAE	0x23
921	UAE (United Arab Emirates)	0xB3	0x43
380	Ukraine	0xB2	0x44
44	United Kingdom	0xB4	0x0E
1	United States of America	0xB5	0x19
598	Uruguay	0xB7	0x3C
123	US Virgin Islands	none	0x3E
58	Venezuela	0xBB	0x3A
84	Vietnam	0xBC	0x1F

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